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Improvement in Machines for Forming Rings, Watch Case Centers, etc.

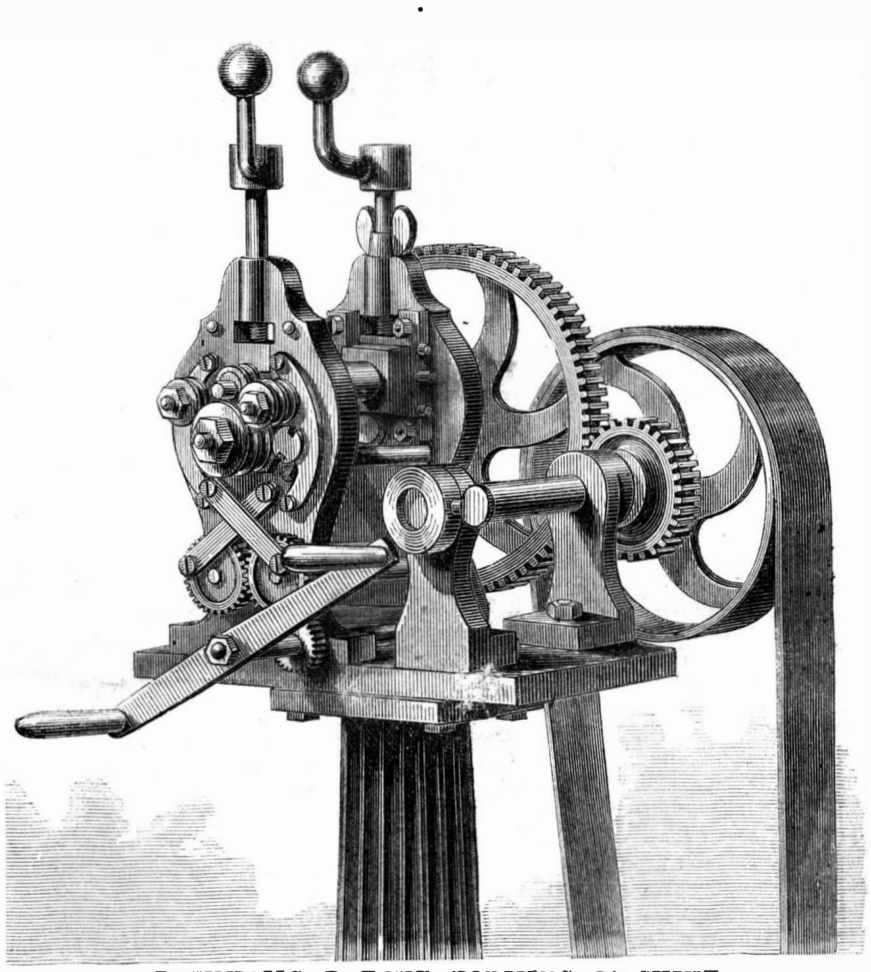
The object of this machine is to furnish a convenient tool for the use of manufacturing jewelers and for watchmakers, although it may be applied to other purposes. It is extensively used by the patentee in making finger rings. The diameter of the ring to be formed and the pressure exerted upon it can be both adjusted and regulated, while the machine is being operated, by simple and easily managed devices.

In a frame are two horizontal shafts, projecting through on one side for the reception of forming rollers of any shape desired. On the other ends are gears connecting the two shafts so that they revolve in opposite directions, and the power, whether hand or steam, is applied on this side. The upper shaft runs in adjustable boxes, by which it can be raised or lowered at pleasure. Concentric with the lower shaft there are, on the roller face of the frame, two curved slides working in corresponding guides and carrying, at their upper ends on studs, two rollers, which work in conjunction with those on the ends of the shafts, and on their lower ends are pivoted arms, the other ends of which are pivoted to the faces of two gears meshing one with the other. A handle on a supplementary gear connecting with one of these serves as a means to operate the gears and the curved slides.

It will be seen that by actuating this handle the rolls of the curved slides will simultaneously advance toward or recede from the circumference of the roll on the upper horizontal shaft, determining the diameter of the ring to be formed, and exerting any pressure required on its interior and exterior surfaces. The machine works equally well when turned in either direction; the direction of the power may be changed at will while rolling a ring either by hand or power; in the latter case by means of two belts, as is the platen of a planing machine.

For forming finger rings, bracelets, and watch case centers this machine is specially adapted. Heavy machines can be built for bending carriage and locomotive wheel tires. The "set" of the adjustable curved slides may be held, if required, rigidly in place to roll any size.

Patented through the Scientific American Patent Agency, April 28, 1868. Further information may be obtained by addressing the patentee, W. H. Peckham, manufacturing jeweler, 12 Dutch st., New York city.



PECKHAM'S PATENT FORMING MACHINE.

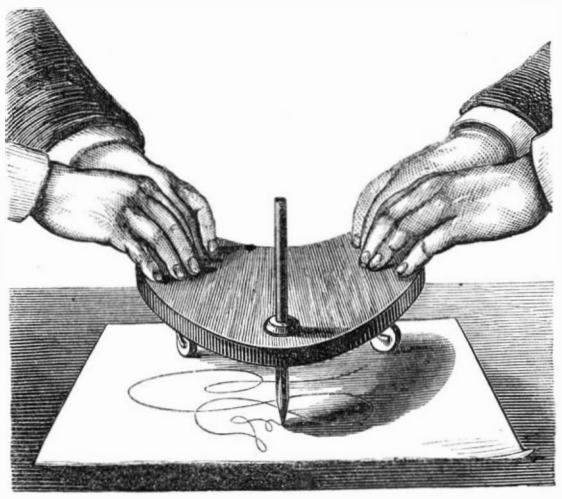
WHAT IS PLANCHETTE?

A peculiar class of phenomena have manifested themselves within the last quarter of a century, which seem to indicate that the human body may become the medium for the transmission of force to inert and dead matter, either in obedience to the will of others, or by the action of the nervous power upon the muscular system, in such a way that those through whom or from whom it emanates, are totally unconscious of any exercise of volition, or of any muscular movement, as acts of their own wills.

The spirit with which scientific men have looked upon these phenomena, has been unfortunately such as has retarded their solution. Skepticism as to their reality, although corroborated by evidence that would be convincing upon any other subject, refusal to investigate, except upon their own conditions, and ridicule not only of the phenomena themselves, but of those who believe in them, have marked their course ever since these manifestations have laid claim to public credence. Such a spirit savors of bigotry. The phenomena of table-tipping, spirit-rapping (so called), and the various manifestations which many have claimed to be the effect of other wills acting upon and through the medium of their persons, are exerting an immense influence, good or bad, throughout the civilized world. They should, therefore, be candidly examined, and if they are purely physical phenomena, as has been claimed, they should be referred to their true cause. This is due to truth, and the common duty which all owe to their fellow men.

The following extract from an English journal, relative to the proposition made by Prof. Faraday, in 1861, to investigate the phenomena reported to have occurred in the presence of Mr. Home, a celebrated English medium, and also relative to the controversy which is now in progress between Prof. Tyndall and Mr. Home, in regard to a similar investigation, which Prof. Tyndall expressed himself willing to undertake, under similar conditions to those stipulated by Prof. Faraday, will sufficiently exhibit the manner in which scientific men have been disposed to treat such subjects:

"He (Mr. Faraday) felt a profound contempt for the whole thing, for which we are by no means inclined to blame him; and he seems to have been a little annoyed at the attempt to draw him again into what he considered ridiculous and futile investigations. It is likely that if Prof. Owen were invited to lecture on and dissect Barnum's woolly horse, he might reply somewhat tartly; it is not improbable that Sir John Herschel would chafe at being invited gravely to investigate Parallax's theories about the shape of the earth and its relations to the planetary system. Mr. Faraday did reply in language which was not encouraging. He prescribed certain conditions which it would have been utterly impossible for Mr. Home to accept, whether that gentleman be an apostle of a new science, or a mere pretender and humbug. In fact. Mr. Home was invited, as a condition precedent to Faraday's entering on the investigation, to acknowledge that the phenomena, however produced, were ridiculous and contemptible. He was also required to pledge himself to the most entire, open, and complete examination—a condition which, of course, Mr. Faraday knew quite well Mr. Home could never



accept. So the gentleman who was apparently acting for Mr. Home—we believe, the late Mr. Robert Bell—declined going any further; and it does not appear that Mr. Home was particularly consulted in the matter at all. At the present moment, Mr. Tyndall offers to investigate the phenomena, but he offers to do so 'in the spirit of Mr. Faraday's letter'; and, of course, Mr. Home replies that 'as such spirit is not that of logic, nor according to the true scientific method,' he declines to lend any aid to the inquiry."

Now we believe that if Barnum's woolly horse was in some way, by virtue of his pretensions, exerting a vast influence upon society, tending to subvert creeds and to introduce new codes of morals, Prof. Owen could not do the world a greater service than to demonstrate to the world, by cutting him up, and thereby cutting down the falsity of his pretensions. Nothing that affects the welfare of mankind should be considered beneath the notice of a true philosopher. What incalculable benefit might have resulted if the same amount of study had been given to the subject of witchcraft, at the time of its occurrence, that has since been bestowed upon it. When such things become matters of history, there are always enough who do not think it derogatory to their dignity to devote their time to speculation upon their causes. How much wiser is it to throw aside prejudice, and to look at the facts themselves in a spirit of candor, and earnest desire for truth.

The latest of the phenomena belonging to the class alluded to above, are those exhibited through the agency of the "Planchette," We purpose in this article to give a brief description of this singular instrument, and also to describe some of the remarkable things which it appears to perform. In thus opening our columns to the discussion of the subject, we say at the outset that we desire any communications that may be called forth upon this matter,—which we know to be attracting great attention in both hemispheres,—to be written with an evident purpose to add to the knowledge already possessed by the public in relation to it, or to give some rational explanation of the cause of the phenomena, which are generally considered so inexplicable. And we further beg correspondents to remember that ridicule is not argument, that it only tends to exasperate, and we assure all who are disposed to deal in that style of discussion, that hard heads, and men of the most materialistic tendencies, have been puzzled and nonplused by the maneuvers of Planchette. The name Planchette is of French origin, and signifies literally a little board. We have seen several styles, differing from each other only in trivial details, the general form being the same in each.

It will be seen by reference to the cut of the instrument, which we give herewith, that it is a heart-shaped piece of board, mounted upon three supports. It is seven inches from the depression in the base of the heart to its apex, and seven inches measured across its widest part. Two of the supports are legs of wood or brass, terminating in pentagraph wheels or casters, usually of iron, bone, or hard rubber. The third support is a pencil thrust through a socket at the apex of the heart. Makers claim that the wood used in their manufacture is peculiar, whether artificially rendered so or otherwise we are not informed, but we have been unable to detect any peculiarity in the appearance of the wood in any that we have seen. Those that we have met with look as though they were made of mahogany or black walnut, lightly varnished, and with little attempt at adornment. In the center of the board we have occasionally seen a disk of metal, having the appearance of German silver, but whether it was for use or ornament, we are unable to say.

The instrument is usually operated by two persons, or perhaps we should say it generally operates when two persons lay the tips of their fingers gently upon it. Occasionally it operates with less force when only one places his hands upon it, and it has been asserted in some of the English journals, that there have been instances of its working when a string was attached to one of the legs, the remote end being held in the hand of a powerful medium, at some distance from the machine.

The phenomena attributed to the Planchette are various, but they consist essentially in writing and drawing. The latter we have never witnessed, but we state it upon good authority. In fact, the wonders of Planchette are backed by the statements of the most reliable people—statements which constitute such a mass of evidence that we should feel bound to accept the facts stated, even though we had not witnessed them ourselves.

You may hold a conversation with Planchette, provided your own part in it consists of interrogations. Its replies, so far as we have seen, are sometimes true and sometimes false. So are the replies often given by human respondents. It sometimes refuses to write at all, and plays the most fantastic tricks, in apparently willful disregard of the feelings of those who are anxious that it should do its best. When, however, it chooses to be good, it moves gently and steadily over the

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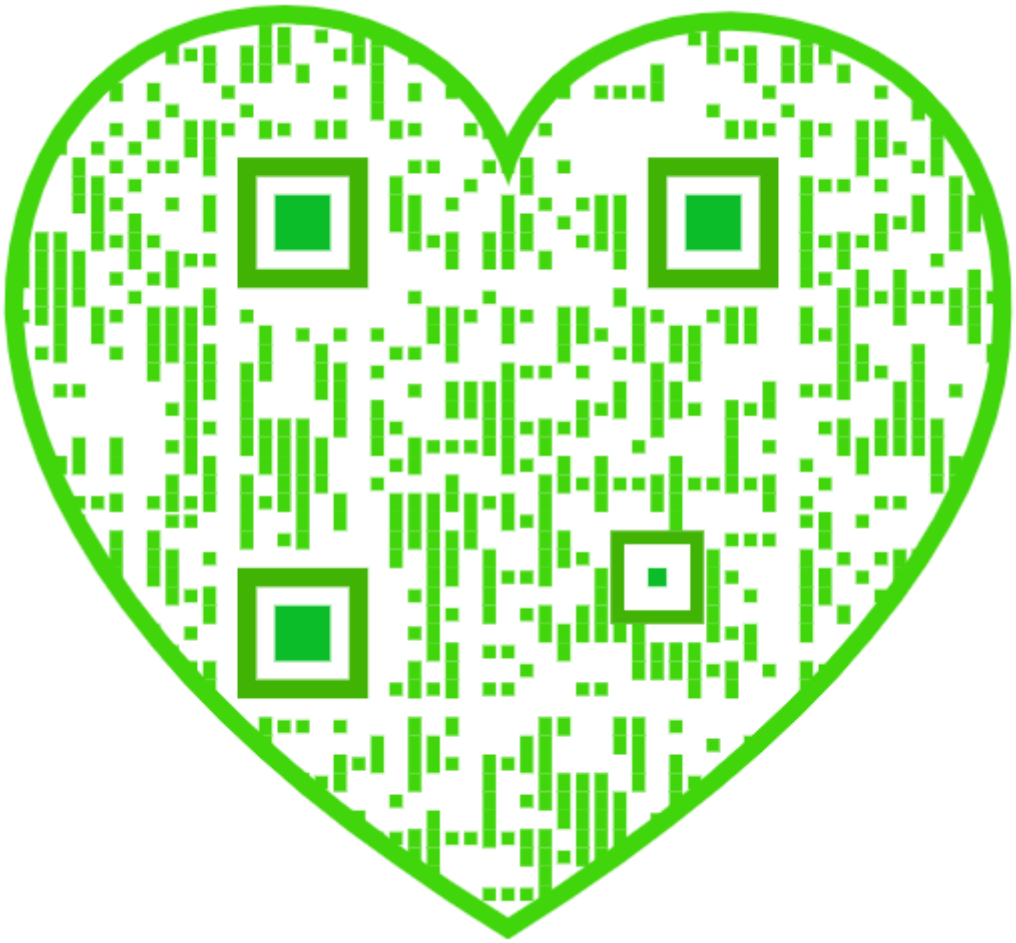

paper upon which it is placed, the pencil point tracing letter after letter, until the reply is written, when with a rapid sweep it announces its conclusion by rushing swiftly back to the left, and stopping suddenly at the edge of the paper. These motions seem to those whose fingers rest upon the board to be entirely independent of their own wills, their only care being to avoid any resistance to its motions. The fact that it is impossible to suppose that the wills of two persons could be by their own desire mutually coincident, without previously concerted action, forms one of the most puzzling features of the subject, as the nature of the questions asked and answered precludes the possibility of collusion.

We have thus stated the facts relating to this mysterious little machine, carefully avoiding the expression of opinion, pro or con, in the hope of accumulating more data in regard to it, and because we believe that the key to the solution of the class of phenomena to which we think it undoubtedly belongs, may be discovered in the investigation of the cause of its movements.

THE IMPOSSIBLE IN CONSTRUCTIVE SCIENCE.

In a brief article in No. 1, current volume, we spoke of the necessity of observing the laws governing mechanical science, and the folly of trying to evade them by denying their existence, or, at the least, doubting their immutability. The following from the *Engineer* treats more at length on this and cognate subjects:—

There are men who seize with avidity on any idea, however chimerical, which is novel, and apparently contains the germ of possible future greatness or wealth. Such men may be found in every walk of life; they are not rare in the ranks of any profession or calling. Sanguine of temperament, and blessed not only with great faith in themselves but with an almost childlike confidence in the powers which can be invoked by science, to them nothing is impossible. In their eyes the present is but a period of pure transition. The deeds of past giant intellects are as nothing compared to what future giants will achieve. Watt, Davy, Faraday, Stephenson, Arago, have but dug the trench and put in the concrete on which a magnificent edifice is to be reared up. Their puny battalions have but explored a few mountain passes—a little scrap of fertile land in a vast continent, which is in the future to be subjugated and made over as a whole to mankind by a select few of their fellow creatures yet to be born. To such simple minds the world owes something, yet not much. The excessive domination of hope in energetic, albeit ignorant men, has aided the great work of progress beyond question; but it is to be observed that few men of science, properly so called, now hold that much remains to be discovered in the great arcana of nature which can materially promote our happiness or our wealth; and the testimony of those who are most learned in the laws of natural philosophy, goes to show that the world has not perhaps quite so much to hope from the future as some would have us suppose. We do not hold that great discoveries may not yet be made, or magnificent inventions produced; but we do hold that it is very unlikely that either discovery or invention will ever again be given to a civilized people which can add to their comforts, or promote their wealth or happiness as greatly as past inventions and discoveries have blessed Britain. The more our knowledge extends the more evident does it become that walls of adamant stand between us and further progress in certain directions on the great highways of science. We admit that many roads remain unexplored. No man in his senses would attempt to prove the contrary; but the balance of evidence goes to show that discoveries out of the realms of pure science must be excessively rare, and that really great inventions—great as a means of materially promoting the happiness and well being of mankind, must be still rarer.

To the student, the enthusiastic inventor, and the ignorant alike, these statements will be eminently distasteful, yet they admit of being proved—proved at least in the sense that the records of the past, and the results of experiments and inquiry made from day to day and hour to hour now, confirm them. To illustrate our position we may cite a favorite argument with those who believe much in the future, little or nothing in the present We are all more or less familiar with the man who laughs at the notion that we shall sink in the scale of nations when our coal fields are gone. He tells us cheerily that long before our coal is exhausted we shall have ceased to rely on steam as a motive power; that agents far more subtle and more energetic will have been made our willing slaves. Not thirty years ago such a proposition would have met with general acceptance. It would have been received as true because, having made a little progress in the study of nature's laws, we had achieved great things by the aid of the knowledge acquired. But it will not be received now by the philosopher. Groping in the dark, men found the steam engine. The brightest rays of the torch carried by the genius of knowledge fail to show us aught better. The researches of Grove, of Faraday, of Joule, ending in the discovery of the conservation of energy, dashed the hopes of the inventor to the ground. For fifty years men have labored to produce a motor better and more economical than the steam engine, and they have utterly failed. This is as nothing compared to what lies behind. The more we learn of the laws of nature the more evident does it become that no better motor than steam will ever be discovered. The thing does not apparently come within the possible in mechanical or chemical science. Neither the engineer, nor the chemist, nor the electrician, can help mankind to anything much better than the child of James Watt's brain. And observe the results following on each addition to our knowledge of the laws of motion. The moment the electro-magnet was discovered hundreds of minds jumped to the conclusion that here was a substitute for the steam engine; yet no electro-magnetic motors are now used save for the most trifling duties. The reason why such machines cannot compete with heat engines was not comprehended for some time. At last it was proved that all the power which an electro-magnetic engine could produce was represented by the oxidation of a given weight of zinc. The metal contained a store of power which was not present in the oxide, but was imparted in the deoxidation of the ore by the combustion of coal, in which alone the germ of power resided; and it is far more economical to burn coal to store up power in water than to burn it to store up power in zinc. We now know that nothing is to be hoped from electro-magnetism as a motive power. It has been assumed that the electricity should be derived not from zinc, but from some such arrangement as the remarkable induction machine illustrated in a recent impression. Apparently nothing is to be done but turn a handle to supply electricity *ad libitum*. There is no friction against rubbers to resist the revolution. Even here, where least expected, the great law of the conservation of force asserts itself once more. A sensible resistance to rotation is experienced precisely proportional to the quantity of electricity generated, and the truth is rendered apparent that the machine creates no new power. It does but transmute some of the energy expended in putting it in motion into the different form of electricity, which may yet again be transmuted into heat, light, or magnetism. Far from realizing more power, we cannot thus get back even the major portion of that which we imparted. And so it is, seek as we will. The more elaborate our search the more fully is the conviction borne in upon us that no means of producing motive power will ever be found to compete with the combustion of carbon or hydrogen.

In fact, as a result of the operation of this great law, that coal is the best power producer known to practical science, we find that the impossible is far closer to us than those possessing that little knowledge called a dangerous thing would have us believe. We cannot drive a ship at thirty miles an hour through the ocean, nor is there any reason to believe we ever can. The resistance increases up to a certain velocity as the cube of the speed; beyond that point, in a still more rapid ratio, not precisely determined No combination of wood or iron could sustain the strain necessary to impel a ship sufficiently large to carry a little coal and an engine of adequate power across the Atlantic in three or four days. Here the impossible makes itself not only seen but felt.

In railway work, again, the progress made during the past fourth of a century has been really very small. At first the public held that a speed of ten miles an hour was impossible of attainment; thirty miles were reached, and the popular opinion flew over to the other extreme—why not travel at a hundred miles an hour? Obstacles all but insuperable stand in the way, and we are as far from travelling at the proposed rate now as we were before Stephenson was born. Many men will be slow to accept the proposition that progress becomes more difficult each year. It is none the less true. The path of the inventor becomes rougher and steeper the further he advances, and all the teachings of science go to prove that there is a limit to man's progress which he cannot pass; laws which he can neither break nor alter, work as he will. When things are brought before us which we know must depend for success on the infraction of some great ordinance of nature we assert that they are impossible, and men of intelligence admit that, assuming the law to be correct, we must be right. But they argue that we do not know the law, that it has never been written nor made clear. That this holds good of many laws, or assumed laws, in natural philosophy is true, but it is not true in those few and simple laws with which constructive science is most concerned. These are as familiar to the man of science as household words; none attempt to dispute their truth but those who lack education.

It is to the last degree unlikely that as much progress will be made during the last half of the present century as marked its first fifty years; but it is certain that progress of some kind will be made. From unlettered men, however, nothing is to be expected. An untutored Stephenson would have no chance of making a name in the present day. He who proposes to go beyond his fellows, to achieve victories greater than those achieved already, must come armed to the combat. It is not necessary that the young engineer must know everything, but he should make one subject his specialty, and know that subject and all the laws relating to it well, or he cannot hope to make the smallest advance. If he proposes to improve the steam engine let him learn all that can be learned about motors, and build on the foundation laid for him by others; if he means to construct bridges of wider span than the world has ever seen, let him study all that can be studied of the laws of strains and the strength of materials; let him learn as well what to avoid as what to adopt. The untaught genius has not the ghost of a chance in the present day, and this is why the necessity for education is felt now as it never was felt in this country before. Only the man of education can distinguish between the possible and the impossible; and, lacking this power, hundreds of men possessing inventive genius of no mean order waste their strength in endeavoring to climb inaccessible precipices or to beat down or elude barriers subtle, indeed, as a spider's web, but stronger and more infinite in their range than average intellects can conceive.

A Mean Swindle.—In another place we give an account of a glaring abuse of the franking privilege, wherein the frank of the Hon. John B. Logan is used to circulate the advertisement of an obscure Patent Agent. Now it is our opinion that no firm is worthy of confidence composed of persons who are too poor or too mean to pay their own postage.

Dangers in the Use of Photographic Chemicals.

M. Davanne, lately read a paper on this subject before the French Photographic Society, Paris. An unfortunate photographer had been endeavoring to prepare some chloride of gold and potassium, but, making some error in mixing or making his solutions, he spoiled them. Upon consulting some one as to how he could get back his gold, he was advised to add ammonia to the solution, instead of the more wise plan of using sulphate of iron, formic acid, or sulphite of soda, etc. Chemical readers would not have added the ammonia, knowing that the dangerous compound known as fulminating gold would be produced; but all photographers are not chemists, although they should be. The poor man added ammonia, and made the explosive compound in considerable quantities. It naturally exploded, and, sad to relate, destroyed one eye completely, and injured the sight of the other very seriously, beside other damage.

Among other dangers to which photographers are exposed, is that which arises from the heavy character of the vapor of ether. Although all light may be a long distance away from the bottle from which the ether is being poured, yet the heavy vapor rolls down and over the receiving vessel, and finds its way to the ground like a stream of water; and if there be an open fireplace or furnace near, the draft from it will draw on the stream of ether vapor, and, igniting it, the flame will run along to the bottle as if along a train of gunpowder, and set fire to the ether in the hands of the operator, probably killing him by burning Then the mixture of alcohol and ether vapors with atmospheric air forms a mixture as explosive as fire damp, and circumstances may arise in photographic manipulations when this dangerous mixture may be produced.

M. Davanne, who is a professor of chemistry, now proceeded to a practical demonstration of some of the properties of the dangerous substances that photographers might produce in their operations. He had prepared at home some of these, but, as he said, in very minute quantities; for, irrespectively of the danger to himself in making them, and the risk of injury to his audience in exhibiting them, there was the chance of doing damage and creating a disturbance on the Boulevards as he came with them to the meering. He took a solution of chloride of gold and added ammonia to it, and showed the precipitate of fulminating gold, which had done so much injury to his correspondent, and, taking a minute quantity of it, which he had previously dried, he caused it to explode by merely touching it on a glass plate with a glass rod. A piece of filtering paper, on which was a minute portion, was held over the flame of a spirit lamp, and exploded immediately; and a capsule in which was a little was shattered to atoms and scattered over the room.

M. Davanne then called attention to a similar compound of silver, which might be easily produced by an unwary photographer, especially that solutions of oxide of silver in ammonia are now so frequently recommended for photographic purposes. A solution of nitrate of silver in ammonia is harmless (*i. e.*, a solution of oxide of silver and nitrate of ammonia, with excess of ammonia); but if the oxide be precipitated from this solution by caustic potash, a compound is produced of even greater explosive properties than fulminating gold, viz., fulminating silver. This dangerous compound, not content with "going off" when dry, is so unstable that it will detonate under water!

Then, photographers with a smattering of chemistry may know that iodine and iron combine and make iodide of iron without danger, and, by a wrong process of reasoning, may conclude that iodine and ammonia will combine quietly and produce the iodide of ammonium for their collodion. Nothing is more fallacious, and now that the ammonio-iodides are again before the photographic public, manipulators who "prepare their own chemicals" will do well to be cautious in mixing iodine and ammonia. This mixture, unless accomplished as recommended by the Rev. J. B. Reade many years ago, will produce an iodide of nitrogen in the form of a brown powder, which is so explosive that if only touched with a feather when dry, will immediately explode.

Another frightful compound of nitrogen is produced whenever nitrogen is passed through a solution of sal ammonia (chloride of ammonium); and although at present photographers are not likely to have anything to do with this fearful compound, M. Davanne wished to point out its properties. It is an oily liquid, and explodes almost without actual touch, smashing lead dishes in which it may be placed, and carrying destruction all around. The discoverer was maimed twice with it, other experimenters have not fared much better, and M. Davanne confessed he had never seen the compound, and never wished to do so.

But there is still another compound of silver which is dangerous, and which a photographer might unwittingly produce—the fulminate of silver. If a solution of nitrate of silver containing nitric acid be warmed, and alcohol added, a white precipitate forms, which is the compound in question, and which is very dangerous, as will be conceived when we remember it is that compound to which percussion caps owe their good qualities, and which, when carelessly handled, not unfrequently will blow up a whole factory, machinery and all. A photographer evaporating to dryness an acid bath which had been in use long, and contained alcohol, might find himself and his dishes elsewhere toward the termination of the boiling down of the solution.

The fastest time, to the best of our knowledge, ever made by a steamboat, was the late run of the *Daniel Drew*, from Yonkers to this city, a distance of fourteen and a half miles, in thirty-four minutes and forty-five seconds, or at a rate of over twenty-five miles per hour.

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Railroad Track-layer in California.

WE have before alluded to the success of a railway track-layer used on the California section of the Pacific Railroad. It appears from recent intelligence to be working regularly at the rate of a mile a day, with the promise of better results when some small defects are obviated. Some of its work has been done at the rate of two miles in twelve hours, but one mile is considered as its present working capacity. The contractor and directors of the Vallejo and Sacramento Railroad, although most of them were skeptical, and some quite dissatisfied about the delays in getting it into operation, give it the highest praise, and have made their arrangements in reliance upon it.

The machine is a car sixty feet long and ten wide. It has a small engine on board for handling the ties and rails. The ties are carried on a common freight car behind, and conveyed by an endless chain over the top of the machine, laid down in their places on the track, and when enough are laid a rail is put down on each side in proper position, and spiked down. The track-layer then advances, and keeps on its work until the load of trees and rails is exhausted, when other car loads are brought. The machine is driven ahead by a locomotive, and the work is done so rapidly that sixty men are required to wait on it, but they do more work than twice as many could do by the old system, and the work is done quite as well. The chief contractor of the road gives it as his opinion that when the machine is improved by making a few changes in the method of handling rails and ties, the necessity of which changes is now apparent, it will be able to put down five or six miles per day unquestionably. This will render it possible to lay down track twelve times as fast as the usual rate by hand, and it will do the work at less expense.

The invention will be of immense importance to the country in connection with the Pacific Railroad, which, it was calculated, could be built as fast as the track could be laid, and no faster; but hereafter the speed will be determined by the grading which cannot advance much more than five miles a day. Thirty millions of dollars have already been invested on the Pacific Railroad, and if the time of completion is hastened one year by this track layer, as it will be if the Central and Union Companies have money enough to grade each five miles a day, there will be a saving of $3,000,000 on interest alone, on that one road.

The track of the Sacramento and Vallejo Road has been laid for eight miles out of Vallejo, and it is to go on directly to Suisun, which is to be reached before the 1st of June, and thence to go on to the crossing of Putah Creek where the cars are to run by the 1st of July. The road passes over a good deal of tule within fifteen miles of Sacramento, where the grading cannot be done till the Fall, so no time is fixed for the completion of that part of the work, except that it must be as soon as possible, and before the 1st of November in any event. The Company has fifty thousand ties on hand, and has lately contracted for fifty thousand more, to be delievered as fast as needed.

New Cement--Liquid Glue.

FEW things are in more constant demand among mechanics than cements, and it must be admitted that most of those in common use are open to improvement. We have recently met with some receipts in the French and German journals, which we put together for the information of our readers. The first is an iron cement, which looks likely to be useful. It is made by mixing from four to five parts of dry clay, two parts of iron filings, one part oxide of manganese, half a part of salt, and half a part of borax. When the cement is wanted for use, this mixture is made with water into a paste, which is applied immediately to the pieces to be joined. It is then allowed to dry gradually, and is subsequently heated to whiteness. After this the cement will resist water, and of course heat. Another, said by Stinde to be a very useful cement, is made by mixing equal parts of oxide of manganese and oxide of zinc, and making them into a thinnish paste with the solution of scilicate of soda of commerce. This paste must be applied quickly, as, no doubt, it sets very rapidly. It is not calculated to resist heat and water—the latter, at all events, not for any length of time. Another receipt we find is for a strong liquid glue. To make this the inventor puts three parts of glue with eight parts of cold water, and lets them stand for several hours to soften the glue. He then adds half a part of muriatic acid and three-quarters of a part of sulphate of zinc, and heats the mixture to 185 deg. Fah., for ten or twelve hours. The mixture remains liquid after cooling, and is said to be very useful for sticking wood, crockery, and glass together.—*Mechanics' Magazine.*

Paint for Stoves.

BLACK lead is a great institution in this country, and probably few but cooks and housemaids would care to see its use diminished. It certainly has its recommendations, but it can hardly be said to be ornamental, while it entails an immense amount of labor on our servants. In Germany, where a stove and sort of kitchen range are continually to be found in the common sitting-room of a respectable family, the unsightliness seems to have been felt, and a suggestion has been made to do away with the black lead, and paint the stoves and ovens. Oil paint, of course, cannot be employed, but water-glass (scilicate of potash) colored with pigment to match the paint of the apartment is the material recommended. Before this is applied the iron must be thoroughly cleansed from grease, and all spots must be rubbed off with a scratch brush. Two or three coats of the paint may then be put off and allowed to dry, after which the fire may be lighted without fear of injury to the color, which may, indeed, be heated to redness. Grease or milk spilt over the paint has no effect upon it, and it may be kept clean by washing with soap and water. Dutch ovens and like utensils may also be coated with the same materials, and the labor spent in polishing be saved. A good coating of the paint, the author says, will last a year or two.

The Strike at the Iron Works in Troy.

A CORRESPONDENT furnishes the *Times* with some interesting facts concerning the above serious strike. It appears that a number of men employed at the rolling mills owned by H. Burden & Sons, Erastus Corning & Co., and John A. Griswold & Co., is about seventeen hundred; the weekly earnings, $25,000; value of one week's productions, $105,000; consumption of coal per week, 1,700 tuns; weight of pig iron used per week, 1,200 tuns.

The strike is now in the third or fourth week of its career, the puddlers and their helpers being the parties chiefly concerned, although some of the rollers and heaters are believed to sympathize with them.

The puddlers earn about $20 weekly, (five days' work), and and the helpers make about $11 in the same time, including lighting up. The cost in wages of making one tun of bar iron from the pig is about $22. The advance asked by the strikers would increase the cost about $2. This the proprietors of the mills affirm, will take away all the profit they are making on bar iron; for this reason they had rather close their mills than agree to the strikers' terms.

The men are acting peaceably, a considerable number of them having gone as laborers to build the railroads now being constructed from Chatham Four Corners to Bennington and from Glens Falls to Fort Edward, although they are in receipt of less wages than if working at the mills. They expect by this to force the mill owners to accede to their terms and at the same time earn enough to keep themselves and families until the lighting up of the mills.

It is impossible to say to what extent the mill owners may be inconvenienced by unfilled orders, but it is generally reported that they can get their pressing orders filled at other works without loss, waiting until their hands are tired of the lock-out or on the approach of cooler weather get other hands to take the place of those who choose to hold out. It is a well-known fact that it does not pay to run iron works in the hot weather, the quantity of coal consumed being much greater for the same production than in cooler weather. For this reason some works are closed in July and August, at which time they take inventory and make their annual repairs.

If this plan was generally adopted it would be alike beneficial to owners and workmen, as the former would save fuel, and the latter would be unemployed at the season of the year when their services would be in demand in the country.

A "Devil Fish."

The *Charleston Mercury* says: "We had the pleasure of a conversation with Prof. Holmes yesterday afternoon, in relation to the submarine monster recently captured by a fishing boat, and now on exhibition on South Bay. The Professor says it is what is known as the sea eagle or clam cracker, a fish very common and abundant in our waters. It is also known by the name of eagle ray or stingaree, a corruption of Stingaray. Very large specimens, some weighing as high as five hundred pounds, were caught here some years ago, their heads and teeth preserved, and may be seen at any time in the Charleston College Museum. They have a snout similar to that of a hog, and root in the mud for clams, which they crush in their mouth with perfect ease; the jaws, instead of being formed of flesh and teeth, having a series of bony plates. The present specimen weighs between 250 and 300 pounds. It is five feet two inches wide from tip to tip of the wings, and four feet long from the snout to the base of the tail. The tail measures five feet, thus making the whole length of the fish nine feet. The negroes in their fright after its capture, in order to disarm it, broke off the stinger, a protuberance from the base of the tail, which is used by the fish as its greatest means of defense."

Microscopy and Cholera.

At the last meeting of the Royal Microscopical Seciety in London, a paper of great interest was read by Dr. Thudichum, "On the relation of microscopical fungi to pathological processes, especially to the process of cholera," in which, after explaining the hypotheses advanced by those who maintain the parasitic origin of cholera, he severely criticised the methods by which their conclusions had been arrived at, and showed the unsatisfactory nature of the conditions under which their experiments had been made. He showed further that the so-called fungoid bodies found in the "rice water" evacuations of a cholera patient were not of vegetable origin, neither were they specific forms, but were identical with those which were equally found in all other decomposing animal tissues and secretions. The results of a large number of personal experiments and observations, extending through various epidemics since 1850, were adduced to show that the choleraic process was the result of chemical, and not of vegetable parasitic action.

AT a meeting of the Société de Photographie, of Paris, M. Civiale made some observations upon the employment of sulphur cyanides in toning and fixing. He stated that in the summer of 1867, he fixed about 700 positive proofs by means of potassium and ammonium sulphocyanides. A print, one half of which had been protected from the light, the other unprotected, and which had been exposed for three months, showed only an uniform tint.

Lightning on the Telegraph Wires.

During a recent storm at Cincinnati, Ohio, the lightning followed the wires into the office, and at each flash concentrated in a sheet of flame on the switch board, producing a concussion similar, at first, to the discharge of a score of rockets, quickly followed by two reports as loud and distinct as the discharge of a six-pound cannon, succeeded in turn by a volley of musketry. It became necessary to disconnect all the wires, and keep them disconnectd about an hour and a half. Some of the operators, who were unused to such severe electric displays, supposed at first that the "day of reckoning" had come.

Editorial Summary.

JOHN BOURNE, the well-known author of the "Catechism of the Steam Engine," and other engineering works, has recently undertaken a new work upon "Modern Steam, Air, and Gas Engines," in which it appears that he claims to have originated nearly all the improvements made in the steam engine since the days of Watt. Part one only has been issued, which gives evidence of considerable self-satisfaction on the part of the author; at the same time it attests his ability to furnish valuable information. The dry engineering details of Mr. Bourne's work are to be relieved by some self-glorification which will no doubt be quite readable.

The Engineer and *Engineering*, both able journals, published in London, are quarreling about their respective circulations, and *Engineering* goes so far as to twit *The Engineer* of having published falsehoods in relation to the matter. We regret that our dignified cotemporaries should permit themselves to war upon each other in this unseemly manner. We do not wish to become parties to this controversy, as it does not much concern us, but we think that if the SCIENTIFIC AMERICAN had a circulation of not more than 5300 copies per week, we should be very careful to keep out of a quarrel about it. The SCIENTIFIC AMERICAN has a greater weekly circulation than the whole of the English and American scientific papers combined, but we do not propose to quarrel about it, on the contrary we are quite happy.

GALIBERT'S APPARATUS IMPROVED.—We have previously given a description of this patent hood, by means of which any person can penetrate into poisonous atmospheres without danger. While communication is kept up with the external atmosphere, the wearer of the apparatus is obliged to rebreathe the air expired by his lungs, and the latter soon becomes surcharged with carbonic acid. M. Galibert now obviates this difficulty by providing a receiver into which he puts potash, the effect being to absorb the poisonous gas and make the expired air again fit for respiration.

THE London local Post Office is one of the best conducted institutions in the world. It employs 1,152 letter-carriers, who distributed 76,000,000 letters in 1863, and in 1868 it is estimated will deliver 90,000,000; that is, 1,730,000 letters per week, and 288,000 per day. Carriers are paid about twenty-five shillings per week, nearly $8.75, and the expense of the department is estimated at £120,000. The net profit amounts to nearly £300,000, or two millions of our money.

CARBONIZING TIMBER.—A Mr. Payen is reported in an English exchange as favoring the process of superficial carbonization of timber, as known and practised by the Romans. He recommends that the whole surface of ships should be carbonized, and for this purpose suggests the use of the gas blow pipe, or when gas is not at hand a blow-pipe and lamp fed with heavy petroleum oils. The carbonization of wood exposed to wet is no doubt useful. It has been employed for many years for preserving fence posts, but it would be rather expensive to apply the process to the hull of a ship as proposed.

MUSKETOES.—A correspondent complains that he is so much annoyed with musketoes that it would be a great blessing if some one would suggest a wash to be applied to the skin that would drive them off. We cannot recommend a wash for their purpose, but have heard it said that the faint odor of crystallized phenitic acid will drive insects from a room.

COLORS.—It has been found, while firing at the "running man" target, at Wimbledon, England, which is scarlet on one side and gray on the other, that the scarlet dazzles the eye, and is hence the most difficult to hit, from leaving a red streak behind it, which unsettles the aim. The gray side was struck seventy-four times and the red only forty-two times. It is a curious fact, too, that those with gray eyes hit fairer than those with eyes of other colors.

PERSONS who wear kid gloves in hot weather, and who perspire freely, will find that injury to the gloves will be prevented by applying ordinary corn starch to their hands (dry) before drawing on their gloves.

HUMBOLDT regards the climate of the Caspian Sea as the most salubrious in the world. Here he found the most delicious fruits that he saw during his travels, and such was the purity of the air that polished steel would not tarnish even by night exposure.

DURING a thunder storm at Birmingham, England, meteoric stones from one eighth to three eighths of an inch long, and about half those dimensions in thickness, fell in immense quantities in various parts of the town.

THE death of a little girl at Kimmswick, Mo., resulting from the sting of a locust, is noted by the local papers.

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Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Morality of Employees.---The Duties of Employers.

MESSRS. EDITORS:—I have often thought, when reading your wonderful paper—the father of a score of papers, living and dead—that you contribute the "mint, anise, and cumin," and neglect the "weightier matters of the law." Fifteen years ago, I tucked your paper with my oily fingers under my apron, and at noon-time read it, with my tin kettle on my knee, holding your paper in one hand, and my bit of salt pork in the other.

You take in all subjects; astronomical calculations, the motion of the seas, the products of the earth, and of the air. In the factory, you discourse of the senseless metals; you tell us how they may be made to minister to the comforts of man; you tell us how the shop tool may be most useful; you inform us of the temper and habits of every thing we see; you give us laws and rules, so that we can extract and get the greatest amount of usefulness from the old knife with which I scraped my pencil an hour ago, to the ponderous engine which drives the belt above my head. All are illustrated and explained in the paper under my elbow. Yet I have always believed that you have failed to notice something of vital importance, the neglect of which has caused more loss and trouble in the factory, and sorrow elsewhere, than seems to be comprehended by employers.

Six months ago, you told us that this city produced, in one year, $200.000,000 worth of manufactured articles; and another authority—the census—tells us that there are 80,000 persons, men, women, and children, employed in making this amount of fabrics. Did the census tell us of the habits of the persons who procuced all this? Did the SCIENTIFIC AMERICAN tell us of, or suggest anything in relation to the condition, the habits, good or bad, of a vast number of human, immortal beings, who spun and hammered out this vast sum of wealth for the State? Your paper tells us—as nobody else can tell us—about inorganic matters. Do you enlighten us about the productions of a man's hands, and let the man himself pass unnoticed? Do you think that the metals should have attention, and leave the mind of the man who works the metal in darkness and neglect? Did you ever hint to employers that they are responsible for the influence which the "hands" exert upon society;—that employers should be teachers of morals and manners, as well as of methods? Did you ever tell employers that they cannot, with safety, "play horse" out on Broad street, and leave the control of their "hands" in the hands of an ignorant and, very often, dishonest foreman, without mischief to the community and himself?

The condition of "hands" in Philadelphia is disgraceful, and would be disgraceful if found in the kraäl of a Hottentot. The Prison Discipline Society should pay a visit to us occasionally, and suggest some reforms to employers. The management is often disgraceful, and more cruel than that of our public prisons. In well regulated prisons, those who are wholly vicious are not allowed to pollute the younger sinners. They are kept in separate apartments, so that the man who murdered a family, and the boy who stole a newspaper, may not come in contact. In our factories, this rule is neglected, and bad men are often filling the places of foremen. Young men—mere boys, with the country grass on their shoes—are placed in contact with grown men leprous with crime. The innocent and the weak are pushed to the wall by the strong and the dissolute. Employers have no other idea than that of extracting so much labor out of them. The man who sucked the alcohol can, pours his filth for sixty hours a week into the ears of that smooth-faced lad who left his mother in tears, in Jersey, a week ago.

The employer says, "I have no time to attend to this matter. I don't trouble myself about the men. Let preachers attend to them. Let them settle their accounts in the next world. It's none of my business."

The employer does not always have to wait till the next world to settle his account with society for the mischief he does in this world. Do you know, Mr. Employer, that you cannot come in at 11 o'clock A. M., rush through your place, and then leave your factories, schools for the education of vice, and not be guilty of a high crime? Do you know that the loss by materials stolen, added to that of the misdirected labors of your hands, often amounts to a moiety of your gains? Do you never turn uneasily on your bed as you hear the heavy tramp of ruffians upon your pavements at midnight? How much extra tax do you pay in supporting the law for punishing the villians? Do you keep a debt and credit account with prisons and almshouses? Or, have you an account current with the hanging committee? Do you ever think that in the mutations of the world the branches of your own family tree may interlace with this poison tree that your own hands have planted? Do you know that vice, like the cholera, visits rich and poor? I know a manufacturer who declared, as you do, that he had no control, yet when a policeman came with some gold watches which had been stolen, when a succession of robberies and a morning murder alarmed him, he became convinced that it was his business. From many years' experience the writer is justified in making these statements.

A man who keeps one of the establishments I have described should be indicted for maintaining a public nuisance, far more mischievous than if he kept a brothel or a bagnio.

When an employer begins to neglect his business, and "play horse," he should dispose of his business, or the horse He cannot keep both.

Employers who destroy the health of their fellow men by keeping them confined in illy ventilated rooms, with the thermometer at 110°, make a poor atonement to the world by endowing hospitals for diseases of the chest. The ears of the Pharisee stick out above the garb of philanthropy. Nobody is deceived. GEO. R. WELDING.

Philadelphia, Pa.

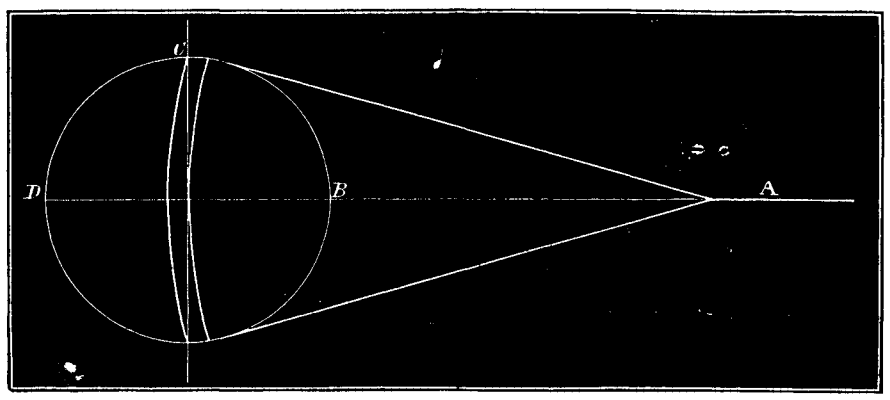
[Nothing we can say in extenuation of the neglect charged upon us can add to the caustic severity of our correspondent's article. We have no doubt that his remarks apply to the mismanagement of many employers, but there are many honorable exceptions.—EDS.

Apparent Variation of the Steam Engine Crank.

MESSRS. EDITORS:—Will you explain why it is that a piston rod, A, of an engine travels further while the crank is moving over the first quarter, B to C, than while it is moving over the second quarter, C to D? I. L. PURDY.

Macedon, N. Y.

[In reply to this correspondent we have engraved a diagram which sufficiently explains the seeming paradox. It will be seen that the stroke of the piston is governed by a circle, the center of which is the center of the bearing of the connecting rod on the crosshead. The quarter stroke, then, representing the half-stroke of the piston, is not the straight cross line at the point, C, but the radial line on the crosshead side. Thus,

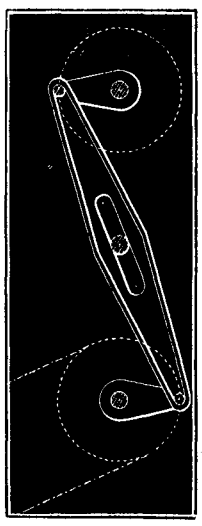


if the crank travels to the point, C, the piston will have moved more than half its stroke in the cylinder. The difference is proportionably less as the connecting rod is longer and proportionably greater as it is shorter.

But it is a notable fact, that many engine builders set their valves by the position of the crank—on its dead center and its half stroke, as found by the rotation of the crank—without regard to the effect of the radial line formed by the positions of the connecting rod and the arc resulting therefrom, as described by the crank and connecting rod together. The consequence is, an unequal working of the engine, to such an extent, in some cases, that one end of the cylinder developes five eighths, and even more, of the power which is shown by the indicator. Sometimes the unequal noise of the valves will show that there is an error, but its extent and the remedy can be accurately ascertained only by the indicator.—EDS.

Connecting Shafts by Pitmans.

MESSRS. EDITORS:—I am fond of contemplating the various parts of machinery, and anything novel in this department of the arts is very interesting to me. I was pleased with your illustration in No 24, last volume, of a new method of converting a reciprocal or oscillatory motion into a rotary one, and its publication reminded me of a plan, by which I overcame a difficulty some three or four years ago, which may be useful to some of your readers.



I wished to revolve one horizontal shaft by another drivenby a belt directly under it, but, for reasons unnecessary to specify here, the use of great wheels or belt as connections was out of the question. I succeeded by employing the device shown in the illustration. The ends of the shafts carried two cranks of equal radius, connected by a pitman, having a longitudinal slot in its center, in which fits a pin secured to some fixed beam, post, or other immovable object. This brief description, in connection with the engraving, will be sufficient to explain the operation of the device.

JOHN ALLEN.

Delaware City, Del.

The Frictional Area of Millstones.

MESSRS. EDITORS:—On page 339, Vol. XVIII., Geo. Rule, of Iowa, says, if I understand him correctly, that the frictional surface of a stone per minute is equal the area of its face multiplied by the number of revolutions it makes per minute. His calculations, based on this principle, give the "frictional surface, or area in feet per minute, of a 4-feet stone, making 180 revolutions, as equal to 2,261·94 feet; and that of a 3-feet stone making 240 revolutions per minute, he says is 1,696·44 feet per minute, a difference in favor of small stones of 565·50 feet per minute."

I differ from him, and give the frictional surface, or area in feet per minute of a stone as equal the area of its face multiplied by its velocity per minute, which velocity is equal to one half the velocity of the circumference. Or, if we multiply the area of the face by the circumference of the stone, and this by one half the number of revolutions per minute, it will give the same.

According to this, the number of square feet rubbed per minute of a 4 feet stone making 180 revolutions per minute is 14,212·29, and in the case of a 3-feet stone at 240 revolutions per minute, it will be 7,994·41, "a difference in favor of small stones of" 6,217·88 feet per minute, instead of 565·50, as stated in the article referred to. C. A. L.

Locksley Hall, Tenn.

Utilization of the Waste from the American Process of Amalgamation.

MESSRS. EDITORS:—In the process of amalgamation adopted in America, great waste is incurred, owing to the formation of calomel which is not recovered. It has been estimated that during the last two hundred years six million cwt. of mercury have thus been lost in the American mines. The object of this article is to show a economical method of recovering this mercury from the waste. The waste is washed carefully until all the soluble matter is dissolved out; the residue being placed in alarge vat is treated with nitrate of soda and hydrochloric acid in slight excess. The calomel is thus converted into corrosive sublimate, which is soluble, the reaction being rather complicated; probably, Hg_2 Cl+Na O No_5—+2 H Cl=2(HgCl+No_4)+NaCl+2Ho.

By mixing with hot water and agitating thoroughly the chloride of mercury is dissolved, and the solution is then run off, by means of a siphon, into another vat. There are now two methods of obtaining the metallic mercury from this solution of chloride. The first, consists in the evaporation to dryness of the liquid, and its reduction by means of slaked lime. This method is objectionable, owing to the volatilization of some of the chloride of mercury without undergoing reduction, thus largely diminishing the yield of mercury. The second and better plan is as follows: A solution of sulphide of calcium, which is formed as a waste production during the reduction, as will be presently described, is added to the liquid in the vat until all the mercury is precipitated as black sulphide of mercury, thus—Hg, Cl+Ca S=Hg S+Ca, Cl. This precipitate is allowed to settle, and the supernatant liquid is then run off. The moisture is expelled from the precipitate by heating to a temperature not exceeding 300° Fah., and the dry sulphide is then reduced in the following manner: After being intimately mixed with from one-half to an equal weight of slaked lime, it is distilled in cast-iron retorts, and the reduced mercury is condensed in receivers partly filled with water, while sulphide and sulphate of calcium remain in the retorts. 4Hg, S+4Ca O=4Hg+3-Ca S+Ca O SO_3. This residue, by lixiviation with water, forms the solution employed for the precipitation of the sulphide of mercury. G. H. MANN.

The Negative Slip of the Screw.

MESSRS. EDITORS:—The screw has three kinds of slip, positive, lateral, and negative. The first of these is so well understood that anything relating to it would be superfluous.

By lateral slip, is meant the penetration of the blades of the screw sideways, that is to say, the medium in which it works being of such a yielding nature the blades are enabled to penetrate it bodily without transmitting any forward motion of the ship. To the lateral slip, the centrifugal action of the propeller may be chiefly attributed. The tendency of the screw when making lateral slip is, as well as penetrating the water, to carry a certain amount around with it between the blades, which water will be liberated as it nears the surface, for it then encounters the least resistance. Consequently the raising of a bank of water over the screw, is dependent in a great measure on its lateral slip, which slip is always increased as the forward motion of the ship is resisted.

This proves the superiority of deep immersion of the propeller, for the deeper it is sunk, the denser will be the medium in which it works, thereby counteracting to a certain extent the lateral slip. In vessels, the positive slip varies between fifteen and thirty per cent. The smaller the vessel, the greater usually is the loss from this cause.

We are all acquainted with the result of negative slip, and understand the term to express that the actual progression of the ship through the water is greater than if the screw worked in a solid nut. In a vessel making negative slip, it is evident by looking at the engines that they are driving something, for the screw shaft will still show the same amount of thrust. The following theories are usually adopted to explain the phenomenon:—

In vessels with a full stern there is a large following current of dead water in which the screw works, and this current gives part of its momentum to the propeller. If a log be thrown overboard, whether it be of the patent kind or not, it will not take cognizance of the speed of the current; but if it was placed so that it could be affected by the forward motion of the current, it would then show the real slip that the screw was making in the moving mass of water, which no doubt would be much larger than was expected.

The centrifugal action of the screw has a tendency to pile the water up at the stern of the vessel, and this acts by its hydrostatic head in pressing the vessel forward, and making the ship as it were, continually slide down an inclined plane. The centrifugal action of the screw causes negative slip, or perhaps better expressed, aids in annulling the positive slip, by drawing in water at the center of the screw and

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throwing it outward. This water has a forward as well as a centrifugal motion, and a part of it is introduced between the blades and the medium upon which they are acting, thereby making the propeller pass through a greater space than is due to the pitch and number of revolutions.

In vessels making negative slip the only thing that can be done is to introduce a coarser pitched screw, for it is a fact that fine pitches and quick speed of the propeller are usually to be found in vessels having negative slip. If a patent screw be introduced, arranged with a variable pitch, it will be found that when the blades are set at a fine pitch, and all of them are in use, a certain amount of negative slip can be produced, but if two of the blades be removed and the pitch remain unchanged, this slip will, probably, disappear. This shows that a diminution in the number of blades is equal to an addition to the pitch. It is also probable that four bladed screws are more liable to negative slip than those of two, on account of their greater centrifugal action.

No possible benefit is derived from the existence of such slip, as in all cases it shows a great want of power, and it also prevents the ship, when resisted by headwinds, from having the same propelling power. I think that in all screw vessels the positive slip is much reduced from some of the causes stated, and that this slip, if measured correctly, would always show that the screw was, to a certain extent, making negative slip, but in the majority of cases, not enough to cause the positive slip to disappear entirely. ENGINEER.

Mechanical Distribution of Electricity.

MESSRS. EDITORS :—It has long been claimed by electricians, that the inner surface of metallic tube cylinders, etc., cannot be charged with electricity. Prof. Farraday states in his "Researches," page 366, that he constructed a hollow cube, insulated it, and charged it with electricity, and he went inside with delicate electrometers, but they did not show any signs of excitement, although the outside was heavily charged. Prof. Henry, in the Patent Office Report for 1859, page 470, illustrates a similar experiment with cups, charged so that sparks could be drawn from the outside and no excitement within. Prof. Douglass, of the University of Michigan, makes the same statement in 1867, and many others have been led into the same error, by neglecting to fully investigate the subject. Without denying the facts stated by those leaders in electrical science, I claim that sparks could have been drawn from the inner surface of Prof. Farraday's cube, and from the inner surface of any hollow cylinder globe or tube, as readily as from the outer. I have even drawn them from the cavity of a man's mouth.

A year ago I tried the following experiment at the Illinois State Normal University. I placed a pithball electroscope within a deep cup, and when the whole was charged with electricity, the balls would not diverge so long as they remained below the edge of the cup, but did diverge when raised above the edge, although they had no communication with the electrical machine, except from the inner surface of the bottom of the cup. I then, with a ball on the end of a small wire, drew sparks from the inner surface of the cup and from smaller tubes. The fact that the inner surface surrounding the balls *is* charged, would account for the non-divergence of the balls—for there is no unsaturated matter to attract them outward, or, to use the common form of explanation, I should say that the repulsion of the electricity on the inner surface, counteracted the repulsion of that on the balls, and they would remain at rest. I think the full investigation of this subject will lead to a complete revolution of the theory of distribution of electricity, and perhaps oblige us to discard the idea of repulsion.

G. WRIGHT.

Fire and Water.

MESSRS. EDITORS :—When fire occurs in a lower story of a building, the plan of Messrs. R. Hoe & Co. to arrest its progress to the upper stories, seems well adapted to effect that purpose. But when a fire occurs in an upper story, past experience shows, that if there arrested, it is usually with great damage by water to the contents of the stories below. Might not this, in a great measure, be prevented by giving a pitch to the floors toward the outside wall of the building with scupper holes through the outside wall to let the water out, to be used over again if need be? The thresholds of the doors and collars around openings through the floor, to be made high enough above the level of the scuppers, to keep a sufficient bed of water on the floor to prevent its burning, and the scuppers to be closed by valves at ordinary times, to keep out the air S.

Providence, R. I.

[That buildings might be made water proof as well as fire proof is susceptible of demonstration. The plan, however, of inclining the floors toward either wall appears to be objectionable. Such a floor would be incovenient to walk upon, and in many ways would annoy. Floors of fire and water proof material might be used, and be at the same time perfectly flush and perfectly safe.—EDS.

Long and Short Screwdrivers.

MESSRS. EDITORS :—In reference to a long and short screwdriver mentioned in your issue of June 20, 1868, you attribute the fact of a long one driving a screw home with more ease than a short one, to the greater leverage it has over a short. I most respectfully beg leave to differ from you.

I am inclined to believe the principal reason or cause is in the spring of the material (the twist spring) of which the screwdriver is made. Take, for instance, two screwdrivers made of the same material, and the same size in every respect, with the exception of the length. Place them in a guide over the holes prepared for the reception of the screws, and I think you will find the long one will drive the screw home with more ease than the short one, which in this case cannot be attributed to any greater leverage, but to the greater twist spring in the material of which they are made, *i. e.*, the longer the screwdriver the greater the spring.

MATTHEW SENIOR.

Philadelphia, Pa.

A Question in Rowing.

MESSRS. EDITORS :—I am able to row a boat three miles in one hour, in still water, without current. If the tide runs five miles per hour, and I use the same exertion as before, with the tide, starting from a given point, how far have I actually (not apparently) rowed, at the end of one hour?

A. D. B.

ANS.:—You have actually rowed three miles.

Absorption of Gases by Charcoal.

In Watts' excellent "Dictionary of Chemistry," Vol. 1, p. 761, there is an account of the absorptive power of charcoal upon gases, which has been taken chiefly from the late researches of Dr. Stenhouse. Having repeated and somewhat extended these experiments, I have thought that so much as follows may be of general interest.

Some pieces of charcoal prepared from a cocoa-nut shell, and which were of a dense, lustrous character, were placed in a tube, and a stream of sulphureted hydrogen, previously dried with chloride of calcium, passed over them. After the lapse of ten minutes, the tube was detached, and indicated on the balance an increase of weight, due to the absorbed gas. A current of oxygen was next passed over the charcoal; the tube became slightly warm, owing to the oxidation of the hydrosulphuric acid, but in no case, in a number of experiments, was there (as I have seen it stated) a spontaneous ignition. On heating with a spirit lamp, vapor of water was condensed upon the sides of the tube, and sulphur deposited; sulphurous acid not perceptible. When platinized was substituted for ordinary charcoal, the amount of moisture and sulphur was increased. Even in this instance, however, ignition was not spontaneous, but followed on the application of the spirit lamp for a few moments.

By depositing finely divided platinum upon the surface and in the pores of the charcoal, a variety of interesting results were obtained. This may be effected by boiling charcoal in lumps or powder in a solution of bichloride of platinum, for five to fifteen minutes, according to the size of the pieces, and then heating the charcoal to redness in a platinum crucible; holding the charcoal in the flame of a spirit lamp will answer. A piece platinized in this way was immersed in a jar, containing one measure of oxygen and two of hydrogen; the charcoal glowed with a dull, red light, and effected a silent combination of the mixed gases. A more highly platinized fragment lit up instantaneously, the jar became clouded with smoke, and union was determined with explosion. In a stream of hydrogen the platinized charcoal, which was previously at the temperature of the room, ignited quickly throughout and set fire to the gas. In oxygen, no action apparent. Held before the nozzle of the compound blowpipe, the jet was speedily lighted. When previously warmed, the platinized charcoal became incandescent in burning gas, but did not inflame it, owing to the high temperature at which coal gas ignites. In alcohol vapor, there was no action apparent in the cold, but a spark previously formed in the flame of a lamp increased in size with the production of acid vapors. A mixture of one volume of hydrogen and one of chlorine was not ignited; whether hydrochloric acid was silently formed at a slow rate was not determined. The importance of such experiments in relation to ventilation and disinfecting will be readily perceived.—*Prof. A. R. Leeds in the Franklin Journal.*

Reappearance of Brorsen's Comet.

The recent appearance of Brorsen's comet, says a writer in the Boston *Transcript*, has furnished another opportunity for verifying the results arrived at by spectroscopic observation regarding the constitution of cometary matter. This comet is of the small number whose periodicity is well established. It was first discovered on the 26th of February, 1846, by M. Brorsen, in Denmark. It was found that the observations made upon it would be best satisfied by the assumption that it revolved in an eclipse around the sun in about five and a half years and its return in September 26, 1851, was predicted. At that date, howeves, the portion of the heavens in which it was supposed to be moving was unfavorably situated for observation and was not detected. The next return by theory, would take place in the spring of 1857, to which time the astronomical world looked forward with great interest. The comet was in fact rediscovered by Bruhns, at Berlin, on the night of March 18, 1857. It followed very closely the track which had been laid down for it. Another return occurred in September, 1862, but owing to unfavorable circumstances similar to those in 1851, it eluded detection. But early this year faithful to prediction, it again appeared, passed its perihelion, and is now rapidly receding from the sun. Father Secchi, of the College Observatory at Rome, says:

"The spectrum of the comet is discontinuous; it consists first of a feeble light filling the field of view, is superposed by three bands so vivid as to appear more dilated than the rest of the field. The brightest of these bands is the middle one, which is in the green, and corresponds to the region between the magnesium and the hydrogen, but much nearer the former; the breadth of this band is very small, not greater than one fifth of the distance between the two rays. At moments when the atmosphere is particularly favorable it is reduced to a bright hue of the same apparent breadth as the nucleus of the comet. Another bright band, but of much less intensity, is in the green yellow, between and equidistant from the sodium and the magnesium. Another band, in the red, may sometimes be distinguished, but its position can be fixed only with the greatest difficulty. The third luminous zone, nearly intermediate between the two preceding, is near the blue end.

"This band is bright enough to admit of measurement, and to produce by scintillation the linear appearance. These observations lead us at once to results of considerable interest. It seems first a justifiable inference that this comet shines not merely by reflected solar light; the only solar light is perhaps that diffused in the field of view. The comet is, then, self luminous, and its light is very like in color that of the nebulæ, but very different in position from that of the nebulous rays."

The Trades of Animals.

The following observations, which we copy *verbatim* from an "Old Curiosity Shop," have reference to animals, and exhibit their at least apparent knowledge of the sciences; also their professions, occupations, and enjoyments: Bees are geometricians—their cells are so constructed as, with the least quantity of material, to have the largest-sized spaces and least possible loss of interstice. So also is the ant lion—his funnel-shaped trap is exactly correct in its conformation, as if it had been made by the most skillful artist of our species, with the aid of the best instruments. The mole is a meteorologist. The bird called the nine-killer is an arithmetician; so also is the crow, the wild turkey, and some other birds. The torpedo, the ray, and the electric eel are electricians. The nautilus is a navigator—he raises and lowers his sail, casts and weighs his anchor, and performs other nautical evolutions. Whole tribes of birds are musicians. The beaver is an architect, builder, and woodcutter—he cuts down trees, and erects houses and dams. The marmot is a civil engineer—he not only builds houses, but constructs aqueducts and drains to keep them dry. The white ants maintain a regular army of soldiers. The East India ants are horticulturists—they make mushrooms, upon which they feed their young. Wasps are paper manufacturers. Caterpillars are silk spinners. The bird ploceus textor is a weaver—he weaves a web to make his nest. The primia is a tailor—he sews the leaves together to make his nest. The squirrel is a ferryman—with a chip or piece of bark for a boat, and his tail for a sail, he crosses a stream. Dogs, wolves, jackals, and many others, are hunters. The black bear and heron are fishermen. The ants have regular day laborers. The monkey is a rope dancer. The association of beavers present us with a model of republicanism. The bees live under a monarchy. The Indian antelopes furnish an example of patriarchal government. Elephants exhibit an aristocracy of elders. Wild horses are said to select their leaders. Sheep, in a wild state, are under the control of a military chief ram.—*Once a Week.*

The New Steamship Holsatia.

This new steamer of the Hamburg American Packet Co., which has just arrived in New York, was built by the firm of Caird & Co., of Greenock on the Clyde. The steamer has a straight stem, round stern, and a flush deck, running clear from stem to stern, affording the crew a fine opportunity to work the vessel, as also an excellent promenade for passengers. Her hull is constructed entirely of the best wrought iron, and is divided into eight water-tight compartments. Her dimensions are as follows: 450 feet length of keel, 45 feet beam, and 38 feet depth of hold; and she measures about 3,200 American register tuns. The main deck is made of heavy iron plates, covered with a wooden sheathing of four-inch planks. She has two iron masts, which are brig rigged and provided with the latest patents and improvements.

The engine, which is provided with a superheating apparatus and surface condenser, is of 600 nominal horse power, but may be worked up to 2,600 horse power by the indicator. The diameter of the cylinders is 72 inches, with a stroke of 4 feet, 6 inches, are supplied with steam from four large boilers, containing 24 furnaces, and consuming about 65 to 70 tuns of coal per day. The propeller measures 17½ feet in diameter, and has a pitch of 27 to 29 feet. The engine, which is a vertical direct acting one, can make 54 revolutions per minute, and when doing so the vessel will attain a speed of 14½ knots per hour, without sails.

The Cunard screw steamer *Java* consumes about eighty tuns of coal per day, and the *Scotia*, a side wheel, consumes more than double that amount. English engineers express the belief that the *Scotia* is the last side wheel steamer which will be built for crossing the Atlantic, as the screws are much more economical in every way.

New Patent Extension Bill.

Senator Ferry, from the Committee on Patents, has reported back, without amendment, a bill which provides that it shall not be lawful to extend any patent where, upon the hearing, it shall be shown that the invention for which said patent was granted was publicly known or in public use in any foreign country for more than six months prior to the issuing of the patent here. It provides, also, that in all applications for the extension of a patent to be hereafter decided, the final hearing shall not be had at an earlier period than three months prior to its expiration; and the duty of hearing and determining all such applications, heretofore vested in the Commissioner of Patents, is henceforth to be vested in the Board of Examiners in Chief.

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The Secrets of the Ocean.

Mr. Green, the famous diver, gives the following sketch of what he saw at the "Silver Banks," near Hayti: "The banks of coral on which my divings were made are about forty miles in length and from ten to twenty in breadth. On this bank of coral is presented to the diver one of the most beautiful and sublime scenes the eye ever beheld. The water varies from ten to one hundred feet in depth, and is so clear that the diver can see from two to three hundred feet when submerged, with but little obstruction to the sight. The bottom of the ocean in many places is as smooth as a marble floor; in others it is studded with coral columns, from ten to one hundred feet in hight, and from one to eighty feet in diameter. The tops of those more lofty support a pyramid of pyramidal pendants, each forming a myriad more, giving reality to the imaginary abode of some water nymph. In other places the pendants form arch over arch; and, as the diver stands on the bottom of the ocean and gazes through in the deep winding avenues, he finds that they fill him with as sacred an awe as if he were in some old cathedral which had long been buried beneath old ocean's wave. Here and there the coral extends to the surface of the water, as if the loftier columns were towers belonging to those stately temples that are now in ruins. There were countless varieties of diminutive trees, shrubs and plants, in every crevice of the corals where water had deposited the earth. They were all of a faint hue, owing to the pale light they received, although of every shade, and entirely different from plants that I am familiar with that vegetate upon dry land. One in particular attracted my attention; it resembled a sea fan of immense size, variegated colors, and the most brilliant hue. The fish which inhabit these 'Silver Banks' I found as different in kind as the scenery was varied. They were of all forms, colors, and sizes, from the symmetrical goby to the globe-like sunfish, from the dullest hue to the changeable dolphin."

DECISION IN A REISSUE CASE.

In the Supreme Court of the District of Columbia, before Justice Geo. P. Fisher, June 3, 1868. In the matter of the appeal of Gage & Whiteley from the decision of the Commissioner of Patents:—

It appears in this case that the appellants surrendered their original patent more than three years ago, and for various causes which it is unnecessary to recapitulate, a reissue has been withheld from them by the Commissioner until a few weeks since. Upon the determination of the Commissioner to grant the reissue, demand was made by the appellants that the reissued letters patent should be antedated back to the date of the surrender of the original patent. This demand was refused by the Commissioner, upon which the appellants have taken their appeal. The question to be determined by me, therefore, is whether a party surrendering an original patent by reason of a defective or insufficient description or specification, or by reason of his having claimed in his specification, as his own invention, more than he had a right to have, is entitled to have his reissued patent dated back to the day on which the surrender was made. In my opinion he is entitled to have it so antedated. I think the language of the act of Congress is clear upon this point. The thirteenth section of the act of July 4, 1836, contains this language: "That whenever any patent * * * * shall be deemed inoperative," etc., "it shall be lawful for the Commissioner, upon the surrender to him of such patent," etc, "to cause a new patent to be issued," etc., "for the residue of the period then unexpired for which the original patent was granted," etc. Section eight of the act of March 3d, 1837, provides "that whenever a patent shall be returned for correction and reissue, the Commissioner shall not grant the reissue until the applicant shall have altered his specification of claim in accordance with the decision of the Commissioner." These are the only provisions which relate to the time at which a reissue is to be granted. It would seem from the language of these provisions that so soon as the original patentee shall have made surrender of his original patent and altered his specification of claim so as to conform it to the decision of the Commissioner, he is at once entitled to have the reissued patent, for the residue of the period then unexpired, that is to say, the residue of the period unexpired when he shall have made the surrender and filed his application containing his corrected description and specification of claim, altered in accordance with the Commissioner's decision.

The law contemplates that the Commissioner shall grant the reissue "upon the surrender" to him of the defective patent, the payment of the fee, and the conforming of the specification to the Commissioner's decision. If we ask the question, at what time the reissue should be made, the thirteenth section of the act of 1836 furnishes the answer in the use of the word "whenever," that is to say, so soon as or at whatever time the surrender shall be made of the original patent and the filing of the corrected description and specification, and also in the use of the words, "the Commissioner, upon the surrender," etc., shall cause a new patent to be issued.

Beside, every consideration of justice and sound policy supports this construction. The object of the patent laws is to encourage the efforts of honest inventive genius by giving to each inventor, upon the payment of the prescribed fee, a monopoly in the usufruct of his discovery or invention for a limited period. In consideration of the benefit which the public is to derive from the production of his genius. It can neither be honest nor politic to say that when an inventor, by reason of a mistake honestly made by himself or his agent in describing the contrivance he has invented, comes forward to have that mistake corrected after half the life of his original patent has worn out, shall have the other half to rust out in the Patent Office between the time of his surrender and the time when the reissue is actually granted.

The case before us furnishes an instance of the manner in which the life of a patent may be wasted in the effort to have such honest mistake as the law contemplates corrected by a reissue.

Believing that the law leaves no discretion in the Commissioner when the surrender of an original patent, and the other prerequisites which it prescribes, have been made and complied with, but peremptorily commands him thereupon to grant the reissue, so as that the inventor may be put in the position of enjoying his discovery for the residue of the term of his original patent, commencing with the date of the surrender and the amended specification, the decision of the Commissioner in this case is overruled, and it is ordered that the reissue be antedated accordingly.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

Owing to a break in the Delaware and Raritan Canal, about three weeks since, there was an accumulation of ten miles of canal boats, laden with coal, sufficient to supply this city with anthracite fuel for three months.

The Waltham (Mass.) Chemical Works cover an area of eight acres, three of which are roofed over. The principal product of the works is sulphuric acid, and in the manufacture 100,000 pounds of sulphur are used each week. The company have five platinum retorts of the capacity of one hundred gallons each. These vessels cost the company $15,000 in gold apiece.

In the vicinity of Virginia City, Nev., are several miles of flumes, all lined with blankets, which require hundreds of men, to change every few hours. This arrangement is for collecting the tailings from the mills, and they yield a much larger profit, according to their cost of production, than is realized from working the ores in the mills. Nearly one third of the bullion shipped from Storey county, in Nevada, is obtained from the waste of these mills, collected in flumes.

A new railway is projected, to connect Buffalo, N. Y., and Baltimore, Md., by a direct route. The road is styled the Buffalo and Southern railway, and with proper connections will only require 120 miles of new rails to be laid, although making the distance between these two cities equal to that between Buffalo and Albany. The company is already organized, and the route is to be surveyed at once.

At Swindon, the London and Great Western railroad company have extensive mills for re-working iron rails. At this establishment, Mr. Hewitt saw a steel-headed rail, made by balling up cast steel turnings in a common balling furnace, and placing the resulting bar on top of a rail pile. The fracture was admirable, and the weld appeared perfect.

Railway postal cars, it is reported, by July 1st will be established on a continuous line from Bangor, Me., to Washington, D. C., and from Bangor to Toledo, O. When the service between Toledo and Chicago is established, there will be a continuous line from Bangor to Omaha.

The discovery of a large bed of porcelain clay in Pope county, Southern Illinois, promises to inaugurate a new branch of industry, and develope an important source of prosperity in that county. The clay resembles magnesia, and produces a ware rivaling, if not surpassing, the iron stone of Liverpool.

The gross earnings of all the railroads of the United States, the past year, amounted to $340,000,000, or equaling about twenty-one per cent of their total cost. This sum averages ten dollars per head for our entire population. The ratio of expenses to earnings is fully seventy per cent, and the net earnings of the northern roads is said to be six and a half per cent of their total cost. In 1840, there was one mile of railway for every 7,465 people in the country; in 1850, there was one mile to 3,298 inhabitants, and in 1860, one mile to every 905 of our population. Mr. Poor thinks that by 1870 we shall have 45,000 miles of road opened, or one mile for every 837 inhabitants.

In the American Watch Factory, at Waltham, Mass., steel screws are made so small that to the naked eye the thread is invisible. It takes 300,000 of them to make a pound, and the iron which at first may have been worth two or three cents, in its new form is a product valued at $4,000. The jewels for the watches, until lately imported from Europe, are now all cut, polished, and drilled by machinery, in the establishment. Twenty thousand jewels are used per month. Most of the finest work in the factory is done by girls.

In the recent address of Mr. Amos Lawrence, before the Cotton Spinners and Planters' Association, it was stated that the production of cotton cloth increased 76 per cent between the years 1850 and 1860, making it in that year 46⅛ yards for every individual of the land. There are now in this country above 6,400,000 spindles. During the past winter these have averaged a daily product of 4¾ skeins—twenty-four to the pound—or 16,000 bales of cotton of 460 pounds per week, which is 832,000 bales per year. This is higher than the average, despite dull times. Some years ago we manufactured one-seventh of the cotton produced in the United States, now we manufacture one-third, and whenever we begin again to export cotton goods, as we did in 1860, the manufacturers will require much more.

One of the finest of railway bridges in Great Britain has just been thrown across the Mersey river, at Runcom. It is a girder bridge 1,000 feet long, and is supported on stone piers rising seventy-five feet above high-water mark, The span of each division is 327 feet, and there are ninety-seven arches, each of sixty feet span. By the completion of this bridge the distance between London and Liverpool is shortened by fifteen miles. The cost of the structure is about $1,250,000.

Turkey proposes a railroad undertaking on quite as extensive scale as the Pacific road. Belgrade on the Austrian frontier, and Bassora on the Persian Gulf, are to be put in railroad connection, the line passing through Constantinople and traversing both European and Asiatic Turkey entire. With certain branches, the road will be nearly 8,000 miles long, and the estimated cost is $300,000,000. The Turkish government guarantees the interest on this sum, seven per cent on a part, and five per cent on another part, amounting to about $175,000,000 a year. The engineers are now at Belgrade, arranging with the Servian government as to the route through Servia.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

FENCE.—W. D. Hillis, Elgin, Ill.—In this invention upright wooden pickets are supported by horizontal wire rails, to which they are attached in a novel manner, the rails being themselves fixed to the posts by a different method than any heretofore practiced, whereby great lightness and strength are combined, and the fence is rendered convenient to handle and cheap in construction.

BEVEL SQUARE.—W. T. Fisher, Lenoir's, Tenn.—This invention has for its object to furnish an improved tool, simple in construction and convenient in use, and which shall combine within itself many of the separate tools now necessarily used in every workshop, such as a bevel square, right-angle square, plumb and level, and rules for measuring distances, measuring hights, taking angles, etc.

PASSENGER REGISTER.—John Enright, Louisville, Ky.—This invention has for its object to furnish an improved apparatus for registering the number of passengers or persons entering street cars, ferryboats and other places, which shall be so constructed and arranged as to register said passengers accurately, and, at the same time, so arranged that it cannot be falsified or made to register an incorrect number without breaking the apparatus and thus show-ing that it has been tampered with.

WASHING MACHINE.—William Hachenberg, White Pigeon, Mich.—This invention has for its object to improve the construction of washing machines so as to make them more conveniet and effective in operation.

COMBINED NECKTIE AND WATCH GUARD.—Thomas J. Flagg, New York city.—This invention has for its object to combine a necktie and watch guard with each other so as to furnish a neat, convenient, and serviceable article.

HOP STRIPPER.—Sidney Holt, Baraboo, Wis.—This invention has for its object to furnish a simple and convenient machine for stripping the hops from the vines, and, at the same time, breaking the clusters into pieces.

RAILWAY STRUCTURE.—John G. Cross, Brattleboro, Vt.—This invention has for its object to improve the construction of railroad rails and chairs, so as to enable the rails to be made stronger and lighter, and so as to make the surface of the track continuous.

LEATHER ROLLER.—James T. Harris, Swampscott, Mass.—This invention has for its object to furnish an improved attachment for rollers for rolling leather, so as to make the machine more convenient in use, and to do away with the annoyance now so frequently experienced from the wet leather adhering to the roller.

BLIND OPENER AND FASTENER.—Martin Streeter, New Haven, Conn.—This invention has for its object to furnish an improved device by means of which window blinds and shutters may opened, closed and secured in place, when fully closed, when fully opened, or when opened at any desired angle, which shall be simple in construction and easily operated.

THILL COUPLING.—James P. Thorp, Southington, Conn.—This invention is designed to regulate the ordinary leather safety straps which are employed to obviate accidents in the event of the breaking of the coupling, the casual detachment of the bolt therefrom, etc. The invention consists in having a hook formed on the plate of the clip, said hook passing through the thill rein in part of the eye through which the bolt passes, whereby the desired end is attained.

PORTABLE DEVICE FOR GRINDING TOOLS.—Daniel W. Ayres, Sheldon, Ill.—This invention relates to a new and improved portable device for grinding tools of various kinds, but more especially for grinding the knives of the sickles of grain and grass harvesters.

FRISKET.—T. W. M. Castle and J. B. Conner, Adriance, Ind.—This invention relates to a new and improved frisket for printing presses, and it consists in a novel construction and application of the former to the tympan of a press, whereby the frisket is operated, opened, and closed, automatically by the raising and lowering of the tympan.

COMBINATION OF HAMMER, RULE, SCREWDRIVER, NAIL HOLDER, AND TACK CLAW.—J. H. Goodwin, Scotland Neck, N. C.—The object of this invention is to combine, in a very simple and inexpensive manner, a hammer with a series of implements used most generally in connection with it, so that several tools or implements may be manufactured in connection with a hammer nearly as cheap as the hammer alone.

MECHANICAL MOVEMENT.—Kenelm John Winslow, Twickenham, England.—This invention consists of an improved method of obtaining motion from a treadle by means of oscillating collars provided with ratchet pawls and retracting springs or cords, and may be arranged for one or two treadles.

MANUFACTURE OF BUTTER FROM WHEY.—Ira Page, Adams, N. Y,—This invention relates to a new and improved mode of manufacturing butter from whey.

SMUT MACHINE.—Carl Millar, Sandoval, Ill.—This invention consists in providing on a suitable framing a vibratory screen to which the grain is first fed, to remove the straw and coarse material from which the grain is delivered to a vertical conical smutter made of an outer shell and interior drum of perforated sheet metal, and provided at its base with a fan through which the grain is passed to a vertical conically shaped brushing apparatus, also provided with a fan at its base, through which the grain is also passed to another vibrating screen, and thence to the hopper for grinding.

RAKING DEVICE FOR HARVESTERS.—Henry F. W. Doterding, Alton, Ill.—This invention relates to a new and improved device for raking automatically the cut grain from the platforms of harvesters, and it consists in a peculiar construction and arrangement of parts, whereby the desired work may be performed in a perfect manner.

MITER BOX.—C. O. Hansen, Memphis, Tenn.—This invention consists in hinging two boxes to a vertical post having a laterally projecting arm, which serves as a guide for a slide to which the two swinging boxes are connected by connecting rods of equal length, and by which the said boxes are caused to oscillate around the said post to bring them to the required angle, by moving the said sliding blocks in either direction on the said laterally projecting plate or arm, and in providing on either end of the said arm opposite to that on which the sliding block works, a post, through which and through a post which forms the axis of the swinging boxes, slots are formed to guide the saw in sawing the angle; and in providing on the said arm a scale indicating the proper position of the boxes for sawing miters for frames of figures having different numbers of sides, and also in arranging the sides of the said boxes so that they may be applied to any body having an angle of any degree, and setting the same thereby, so that miters may be sawed in the boxes without further adjustment of the same to fit the said angle.

EXTENSION HORSE OR TRESTLE.—George H. Pierce and Martin T. Glimsdal, Mineral Point, Wis.—This invention relates to a portable trestle horse for scaffolding and other purposes, and consists of certain elevating and extension devices for accomplishing the purpose.

HINGE FOR WINDOW BLINDS AND SHUTTERS.—E. H. Benjamin, Oak Hill, N. Y.—This invention relates to certain improvements in window blind hinges, whereby the same is held open by the automatic action of the hinge and weight of the shutter.

TIRE BENDING MACHINE.—Robert Tyrrell, Sumner, Ill.—The object of this invention is to accomplish the bending of wagon tires in an easy and expeditious manner. It consists of revolving disk operated by a lever arm, by means of which the tire is drawn between the periphery of the disk and a roller wheel, and bent around the disk, together with other devices perfecting the whole.

HORSE RAKE.—Jacob Ginther, Mier, Ill.—The object of this invention is to provide a horse rake which will operate more satisfactorily than those of similar construction heretofore made. It consists of mechanism for revolving the rake proper.

TRACE BUCKLE.—Martin Gayhart, Young America, Wis.—The object of this invention is to provide a buckle for leather traces or tugs, which shall be simple, effective, and easily operated. It consists of two parts, which are pivoted together, and which pinch the trace when strain is brought upon the two parts, whereby the pinching action relieves the tongue from a portion of the draft strain of the trace.

DEVICE FOR STOPPING AND STARTING CALENDER ROLLS.—Wm. T. Porter, Wilmington, Deleware.—The object of this invention is to operate the friction clutch of calender rolls in paper machines by means of a rod bar or bolt running through the axial center of said roll.

HAY FORK.—Henry L. Doane, Green Oaks, Mich.—The object of this invention is to furnish a hay fork of the class generally known as horse hay forks. It consists of a pair of hinged or swinging tines connected with a corresponding pair of fixed tines, the construction and operation of which is exceeding ly simple and effective.

HOISTING APPARATUS.—Dexter Head, Medusa, N. Y.—This invention relates to a new device for elevating loads of suitable description, and consists in the application of a system of levers, known under the denomination of lazy tongs. By the use of this invention articles can be elevated to considerable hights, with the aid of inconsiderable motive power.

PLOW.—J. M. Wilson, Lexington, Miss.—This invention relates to a new plow, to be used by cotton planters; the object being to work the ground, when the young cotton plant is just out. Cotton, when young is a very delicate plant, and is difficult to work the first time; my improved plow is intended to work close to the plants without injuring the same, leaving the cotton on a very narrow space at the surface, yet with sufficient base at the bottom of the furrow, to prevent it being knocked up by the hoes, when they are used in working through the drill. The plow will also turn up the soil sufficiently to thoroughly cover up the middle of the row. This plow will work in every kind of land more effectually than the ordinary turning plow.

CARPENTERS' GAGE.—A. H. Blaisdell, Newton Corner, Mass.—This invention relates to a new carpenters' gage for drawing marks parallel to the straight or curved lines of a board or other article, and the invention consists in the use of V-shaped tusks or fingers, pivoted to a sliding block, said tusks being by means of rods connected with a beam that is pivoted to another fixed but adjustable block. The ends of these fingers form the edge of the gage, and they will when the gage is drawn along the curved edge of the beam, always adjust themselves, by swinging around their pivot pins, so as to keep the marking point the required distance from the board's edge.

SHOE LASTER.—Peter Thompson, Sardis, Ohio.—This invention relates to an improvement in pincers or for other purposes, and consists in combining four jaws which are operated by the ordinary pincer handles or levers.

HORSE POWER.—Joseph H. Kleppinger, Cherryville, Pa.—This invention relates to a new manner of arranging the mechanism, for converting the power of horses or other animals into rotary motion for driving thrashing and other machines. The object of the invention is to equalize the motion of the driving shaft, so that if the horses should not move quite regular or should be slightly disturbed in their work, the machine should not also acquire such irregular motion, but should continue in equal motion and move with the same velocity.

MEAT CUTTER.—S. L. Stockstill and H. H. Dille, Medway, Ohio.—This invention relates to a new machine for cutting meat for the production of sausages, hash, and other articles of food, and consists chiefly of two rollers, of which one carries a set of cutters that work between arms projecting from the other and through a stationary slotted plate. The cutters and the arms are set spirally around their respective rollers so as to feed the cut meat toward one end of the machine, where it is discharged.

HAT BLOCKING MACHINE.—Jacob Eberhardt, Newark N. J.—This invention relates to a new device for pressing hat bodies into the required form, and consists in the use of a rubber or other elastic punch, which is of suitable shape, and upon which the unshaped hat body is fitted, and of a counter-sunk die, in which the hollow has the required shape to be given to the hat. By forcing the punch into the die it will become pressed, so as to assume the shape of the die, and the hat will thus be easily formed.

GAS BURNERS.—A. C. RAND, New York city.—This invention relates to a new manner of constructing gas burners of that class in which the gas issues through a long, narrow slot, and consists in making the width of the aperture adjustable, so that a larger or smaller jet may be discharged from the burner, as may be desired.

FRAME FOR FLOWER DESIGNS.—C. Hochbrunn, New York city.—This invention relates to a new manner of constructing the frames for flower ornaments of that class in which suitable designs, such as wreaths anchors, hearts, stars etc. are made of amaranths or other suitable flowers or plants The invention consists in making these frames by winding wire around moss, and in strengthening the whole by means of strong wire or other stays.

TOY CANNON.—George H. Hutchinson, Cleveland Ohio.—This invention relates to a new spring toy cannon, which is so arranged that it can be easily set, and easily discharged, and consists chiefly in arranging the device for returning the compressed spring upon the body of the cannon, and not at the breech end of the same, as is now generally done. The invention also consists in confining the front portion of the spiral spring in a barrel, so that a pin, which forms part of the detaining apparatus, can, by falling in front of the barrel, detain the compressed spring.

TAILORS' MEASURE.—Wm. Sinnott and John McNaughton, Brooklyn, N. Y This invention relates to a new device for facilitating tailors to take correc

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measures for gentlemen's coats, and consists in the use of an adjustable quadrangular frame, composed of metal bars, upon each of which a graduating scale is marked. This frame, when laid around the arm of the person whose measurement is to be taken, can be adjusted to give the exact width of the arm, and the distance from the shoulder to the armpit.

SADIRON.—James Gray, Newark, N. J,—This invention relates to a new self-heating sadiron, which is so arranged that the cover of the iron will remain cool, and so that the draft can at all times be regulated at will. It consists in the use of a perforated body fixed stationary in the lower part of the hollow sadiron, its interior communicating with the outside air by a hole in the side of the iron; the hole being arranged high enough to prevent the falling out of ashes.

POCKET COOKING STOVE.—Joseph Smallwood, St. Johns, N. B.—This invention relates to improvements in portable stoves for workmen and others, whereby they are enabled to heat their coffee or tea, and warm their dinners, when laboring in the field or wood.

INNER SOLES FOR BOOTS AND SHOES.—R. A. Webster, Sandisfield, Mass.—This invention relates to a new and useful improvement in soles for boots and shoes, whereby such boots and shoes are rendered impervious to water, and soft and pleasant to the wearer.

HOT AIR CHAMBER.—Wm. H. Lee and Charles M. Hardenburgh, Minneapolis, Minn.—This invention relates to a method of constructing hot air chambers, to be combined with air-heating furnaces, for heating public buildings and private dwellings by heated air.

CARBURETING AIR.—Henry C. Appleby, Conneaut, Ohio.—This invention relates to a new and useful improvement in an apparatus for carbureting or charging atmospheric air with the vapor of hydrocarbon liquid, for illuminating purposes.

CONVERTIBLE LOUNGE.—Lewis H. Baker, Tarrytown. N. Y.—This invention relates to the construction of lounges or sofas whereby they are made to serve various purposes, and are made much more convenient as an article of household furniture than the ordinary kind.

ORGAN.—Isaac Roush and J. W. Truby, Otto, N. Y.—This invention particularly relates to a connection and arrangement of parts, whereby the stops can be operated without requiring the use of the hands, and enables all double levers to be dispensed with.

TABLE CUTLERY.—R. H. Fisher, West Meriden, Conn.—This invention consists in the use of a bifurcated or split tang, which is formed at the end of the blade, in such a manner that the outer edges of the two tines or prongs will be flush with the edges of the handle. The ends of the prongs are bent in so as to have a firm hold in the wooden or other handle. The bolster is fitted into recesses formed in the edges of the tang, so as also to be flush with the edges of the handle and tangs.

SAFETY GUARD FOR MINING SHAFTS.—E. O. Leermo, Gold Hill, Nevada.—This invention consists in the arrangement in a transverse, dovetail groove in the rail, a short distance from the mouth of the shaft of a sliding bar, the upper surface of which projects above the top of the rail sufficiently to block the wheel of a car when it is moved in the right position, which sliding bar is caused to slide in front of the wheels of the car, to block it by the action of a spring when the cage is not ready to secure the car, and which is drawn away from before the said car wheel by the action of a lever, which is actuated by the cage when the latter is moved into the right position to receive the car, whereby the car is allowed to run on to the said cage.

THREAD CUTTER.—C A. Woodbury, Woodstock Vt.—This invention consists of a circular cutter of somewhat larger diameter than the spool having a central hole and provided with a shield of larger diameter than itself, having notches in the edge forming rounded points or teeth. Near the center the shield is provided with springs projecting therefrom in an axial direction. The shield is attached to the cutter by inserting the springs in the eye of the cutter and bending the pointed projection of the edge over the edge of the cutter, which when so constructed is attached to the spool and held thereto by inserting the springs in the axial hole of the spool.

CULINARY DEVICE—Clayton Denn, Frankford, Pa.—This invention consists of a gridiron provided with a flange projecting downward from the bottom for sitting into the stove hole, also an upward projecting rim and a hollow handle so inclined with reference to the grate as to admit the gravy to flow therefrom into the handle. It also consists of a cover provided for the said gridiron with a rim to fit over the rim of the latter hollow handle which serves as a cover to that of the gridiron, and flanges projecting upward from the top whereby it may be used separately from the gridiron to serve as a cake griddle by turning it bottom side up and setting the said flange in the stove hole. An opening is provided through the rim of the gridiron in the direction of the handle, whereby a wire gridiron also having a handle may be set within the above described device, when it is desired to cook oysters, or other small things which would fall through the bars or grates.

CONNECTING LEAD PIPES.—Isaac Davis, Brooklyn, N. Y.—This invention relates to a new method of connecting the ends of lead pipes, without soldering, so that they can be easily secured together and easily taken apart.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

Ezekiel Moores, Mount Vernon, Ill.—Twenty dollars received without advices.—What is it for?

U. S. of Mich., asks, "How much lead is it advisable to give an engine 14 inch cylinder by 60-inch stroke making 54 revolutions per minute and cutting off at seven-eighths? 2d, How much cord wood ought such an engine to burn in a day running 22 hours and generating 23 actual horse power, the wood being mixed, hard and soft, half seasoned? 3d, Can you give me a rule for setting the axles of ordinary wagons with regard to the set and "gather," and other points necessary for wheelrights? As for the lead of your engine we can give no positive answer without knowing the style of your valves. If the exhaust can be controlled independent of the inlet, close the exhaust at nine tenths the stroke of the piston and you will not require any steam lead; the "cushioning" of the steam will answer the same purpose. If you cannot cushion on the exhaust, set your valves so they will be just preceptibly open when the engine is on the center. 2d, If your engine is in order, cutting off at seven-eighths of the stroke, it would require about 6 lbs. of anthracite coal per hour for each indicated horse power. A cord of well seasoned hard wood is reckoned as about equal to half a tun of anthracite; one pound of the first being calculated to raise 5,000 lbs. of water to one degree of heat and the same amount of anthracite 9,560 lbs. 3d, See page 217, vol. XV, SCIENTIFIC AMERICAN.

E. B., of Mass., asks if some of our correspondents will give the reason of the long continued sound of thunder. "Distance, reverberation, echo, etc., are referred to as the reason. Do they sufficiently explain the phenomenon?"

C. L. A., of D. C., asks, "Is there any practical objection to the construction of a railroad on the following plan: Track 8 feet wide between rails; wheels 12 feet diameter, of wood and iron combined; curves never less than the radius of a mile? In running 100 miles car wheels of 3 feet diameter make about 58,666 revolutions, while those of 12 feet diameter would make only about 14,666 revolutions. It appears to me that ease of draft and movement and greater speed, with less strain on the wheels, would be attained. Is there any reason why railroad companies, at home and abroad, have adhered to small wheels and narrow gage?" It is a notable fact that wide gage roads—6 feet—as compared with the narrow gage—4 feet 8 inches—have in this country proved unprofitable. The excessive weight of the rolling stock, its greatly enhanced first cost, the additional expense of the road bed, etc., have more than counterbalanced the increased capacity for freight—there is no increased carrying capacity for passengers. Wheels of 12 feet diameter could not be as cheaply or strongly made as those of less diameter, and the combination of wood and iron would hardly receive the approval of sensible engineers, except as wood is employed in the Griggs' patent to hold locomotive tires in place.

T. C. M., of Wis.—The weight of water being 1, that of cast iron is 7. 2, and of lead, 11. 3. For further information as to the relative weight of different substances we refer you to any manual on mechanics or treatise on natural philosophy.

J. R., of Pa.—The information on petroleum you desire, can only be obtained in the petroleum regions, from those who make it a business to bore wells, and strike oil when they can. Very little has been published on the subject, it being entirely new.

R. S., of R. I.—There is no danger whatever of coal or wood ashes taking fire by spontaneous combustion, after they are once cold and thoroughly extinguished; only do not pour linseed oil or another similar substance on them.

J. D., H.—1st, Mica can be bought in pretty large slabs, say one foot square, without cracks; however it is never as uniform as glass. 2d, There is no other transparent substance known impervious to water and fire-proof. 3d, You can bend it to any shape, like cardboard, provided thin plates are used, as they are very elastic, but their rigidity increases with their thickness.

J. B. F., of R. I.—There is no difference in the useful effect of a suction or lifting pump of the same size when the same amount of water is attempted to be raised to the same hight by the same power employed only in the lifting pump the lower position of the piston, necessitates longer rods, more weight to carry, and more exertion to overcome. In this respect the suction pump may sometimes have a slight advantage.

J. P., of Pa.—Iron bolts may be cleaned from grease, by moistening them with benzine, and rolling them in dry sawdust; afterward brushing.

J. D., Idaho Ter., wants a simple method to treat sulphurets in the raw and unworked state by the wet process, in quantities of at least 500 lb. This is exactly the result that thousands of metallurgists are at present seeking after, but so far without success.

J. A. W.—Condense your ideas on boiler explosions. We have not room to publish so much.

B. K., of Pa.—The plan of using compressed air as a generator of power is one of the usual hobbies of men of limited information; it must be remembered that compressed air acts like a spring wound up, never can more force be got out of it, than is put in.

E. R., of Wisconsin, is a new inventor of perpetual motion. He proposes to use compressed air for working an engine which moves an air pump, and thereby keep up the full pressure of air in the vessel, which again works the engine, several other engines besides, and so on; he says if he "were blessed with a large share of this worlds goods" he would "develop the idea, though it might cost thousands of dollars." We think it fortunate for our correspondent that he has no money to waste.

R. H. D., of Pa.—Matches without sulphur or phosphorus are made of three parts chlorate of potash, three of ground glass and three of bichromate of potash, two of Dextrine or gum and eight parts water; There are several receipts more or less reliable, the simplest is perhaps chlorate of potash two parts, gum arabic three parts, and soot one part.

T. W., of Vt.—Without having a sample of the deposit on your pans to analyze, we cannot tell what will dissolve it; if it is a compound of lime, hydrochloric acid is the most ready solvent.

E., of M.—A round flue having less interior surface in proportion to the area of its section, gives less resistance to draft. When the flue is wide enough, the form is not as essential as the smoothness of the interior surface. A rough flue gives much more obstruction to draft, than is generally supposed, specially when flat or narrow. When wide enough to give exit to all air and smoke, and long enough to insure the steady and powerful ascent of the heated gases, there is nothing gained by widening it at the top, except when the lower part is too narrow, then a widening at the top may compensate for this to a certain degree.

G. W. B., of Va.—Curiosities of the kind you mention are not very salable, in fact of little value except to some amateur whose fancy induces him to buy.

J. R. C., of Iowa.—You cannot compare the effect of the pressure of a body in rest, with that when in motion; it is the old problem of the *vis viva* revived. Your hammer of 1400 lbs. falling 30 feet, has an effect which cannot be compared by single pressure; after a certain theory it would be equal to 1,260,000 lb. falling 1 foot or nearly 200,000,000 pound falling 1 inch, but the effects are so much influenced by the relative weight of hammers, piles, nature of soil, etc., that no general rule can possibly be arrived at. Imagine only a very small weight driven by great velocity on a heavy mass; it will of course not move it, but its effect will be only confined to the locality of contact. You may find further explanations in any good book on Dynamics.

J. B. W., of Washington.—Your well written communications are not adapted for our paper, being too speculative. Articles to be accepted must be on practical subjects and condensed as much as possible. You rightly attack old fogyism in science, but our advice is to study the modern doctrine of the correlation of forces. For instance in Tyndall's recent work "Heat considered as a mode of motion," you will find an essay on the subject you treat, Cosmogony, and will discover that combustion and chemical action generate only a very small amount of the heat distributed in the universe; they are not the primary produces of heat, but a deeper cause is at the bottom of all these and other phenomena of caloric action. The above mentioned or other recent works of Mayer, Joule, Helmholz, Grove, etc., explain all this in detail.

EXTENSION NOTICES.

William Thornley, of Philadelphia, Pa., having petitioned for the extension of a patent granted to him the 19th day of September, 1854, for an improvement in safety washers for securing wheels to axles, for seven years from the expiration of said patent, which takes place on the 19th day of September, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 31st day of August next.

Abner Whiteley, formerly of Springfield, Ohio, now of Platte County, Mo., having petitioned for the extension of a patent granted to him the 19th day of September, 1854, for an improvement in grain and grass harvesters, for seven years from the expiration of said patent, which takes place on the 19th day of September, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 31st day of August next.

Harry H. Evarts, of Chicago, Ill., having petitioned for the extension of a patent granted to himself and A. J. Brown as assignees, the 31st day of October, 1854, for an improvement in shingle machines, for seven years from the expiration of said patent, which takes place on the 31st day of October, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 12th day of October next.

Stephen J. Gold, Cornwall, Conn., having petitioned for the extension of a patent granted to him the 3d day of October, 1854, for an improvement in warming houses by steam, for seven years from the expiration of said patent, which takes place on the 3d day of October, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 14th day of September next.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Carbonate of Barytes wanted in large quantities. Address A. G. Hunter, Fair Haven, Conn.

If you desire to invest moderate capital, safely and profitably, we offer City, County, State, or the entire right in "That Dipper," "The Universal Weighing and Measuring Cup," "The Little Wonder," or "Combination Funnel," (with six distinct uses), and the "Adjustable Dredge." Address Marsh & Co., 33 Maiden Lane, New York, Gen'l Agts for U. S.

Wanted—a six-horse portable engine and boiler. Address, with particulars and price, Edward Park, Binghamton, N. Y.

Wanted—illustrated priced list of all kinds of shingle, stave, barrel, and heading machinery. Address L. T., Valley Forge, Mo.

Brick Machine.—Lafler's New Iron Clad has more advantages than any other ever invented. For descriptive circular address J. A. Lafler & Co., Albion, Orleans county, N. Y.

Adams' improved air cylinder graining machine, in operation daily and specimens of work at 44 Murray st. Send stamp for circular, full particulars, prices, etc. Address Heath, Smith & Co., as above.

The surest detective of low and high water, and high steam in boilers yet invented. Springer, Hess & Co., Philadelphia, Pa.

Bartlett machine and needle depot, 569 Broadway, New York. Needles for all machines, hackle, gill pins, etc.

Merriman's patent bolt cutters—best in use. Address, for circulars, etc., H. B. Brown & Co., New Haven, Conn.

Prang's American chromos for sale at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

For breech-loading shot guns, address C. Parker, Meriden, Ct

Winans' Boiler Powder, for 12 years a positive remedy for Incrustations, is so extensively imitated and pirated, by pretended agents, that it is not safe to buy except at 11 Wall st., N. Y.

NEW PUBLICATIONS.

THE BLOWPIPE. Its Practical Use. By G. W. Plympton, A.M. D. Van Nostrand, 192 Broadway, New York.

The object of the compiler of this volume is to present to the beginner in chemical analysis, plain, practical instruction on the use of the bowpipe in the laboratory and workshop, with full directions for its manipulation, descriptions of the best reagents, etc. It is illustrated with cuts and contains valuable tables of the reactions of metallic oxides and metallic acids, with a copious index for reference. It will be found to be advantageous not only to the beginner but to those more advanced in chemical science.

THE AMERICAN CARBON MANUAL.

Photographers will be glad to know that they can now obtain, in the above work, full and complete directions for producing their prints, without silver, by means of the new carbon process. This method has been so improved and simplified that it may be readily practiced with success by all photographers. The pictures produced by it are very uniform, and any desired tint or shade may be easily imparted. The book before us is from the pen of Edward L. Wilson, the accomplished editor of the *Philadelphia Photographer*, Published by the Scoville Manufacturing Company, 35 Park Row, New York.

THE FAMILY RECORD. Biographic and Photographic. Arranged for recording in detail the personal incidents in the life of each member of the family. By John H. Griscom, M. D., New York.

The author of this record has arranged a very convenient and practical work, which ought to be possessed by every family. The first page is set apart for the names, birth, marriage, etc., of both husband and wife, and also a space for photographs. There is also room for personal incidents, and it contains a register for the different maladies which afflict children. A book of this kind, if well kept, would be invaluable to families, not only for present but for future reference.

NEW YORK CITY DIRECTORY, for the year ending May, 1869. Compiled by H. Wilson. John F. Trow, publisher, 52 Greene street.

The task of collecting the names, business pursuits, and residences of 185,751 citizens, alphabetically arranging the same, and publishing the whole in the space of a few weeks' time, is one the magnitude of which can be known only to those who have attempted similar undertakings, and is only made possible through the perfected system of obtaining information which long experience has taught the publisher of this volume. The yearly growth of the city and the increasing demands of business make us a migratory people, and necessitates the recompilation of the entire work annually. "The whole city is like a huge kaleidoscope which annually dislocates itself and forms a new figure," and to point out these changes is the province of the "Directory." The number of names this year, as stated above, is 185, 751, being an increase of 8,434 over the number contained in the issue for 1867-8.

FOOTPRINTS OF LIFE, OR FAITH AND NATURE RECONCILED. By Philip Harvey, M. D. Published by Samuel R. Wells, 389 Broadway, New York.

This volume embraces a poem of considerable literary merit. It traces the origin of the body through a progressive development to the end of life. It also treats of the soul and of Deity with pious reverence.

A GUIDE TO THE STUDY OF INSECTS, and a Treatise on those Injurious and Beneficial to Crops, for the use of Colleges, Farm Schools, and Agriculturists. By A. S. Packard, Jr., M. D., of Salem, Mass. Part I. Price 50 cents.

This very instructive and excellent pamphlet of 60 pages is copiously illustrated with wood cuts of a great variety of insects, and deserves to be read by all those who are engaged in the culture of the soil.

HALL'S HEALTH TRACTS.

This volume contains an interesting series of practical tracts on health, which have appeared from time to time in Dr. Hall's *Journal of Health*. The author is a prolific writer, and aims to bring to the reader's attention a sensible way of preserving the health by other means than the quack medicines, which curse our go-ahead countrymen and women more than any other people in the civilized world. The French are probably the healthiest people in Europe. They stay out of doors a good deal of their time, and take little medicine.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS

1,604.—APPARATUS FOR SEWING OR STITCHING SEPARATE PARTS OF A VOLUME.—H. G. Thompson, New York city. May 16, 1868.

1,618.—APPARATUS USED IN THE MANUFACTURE OF IRON AND STEEL.—A. L. Holley and J. B. Pearse, Swatara, Pa. May 16, 1868.

1,644.—APPARATUS FOR OPENING SARDINE AND OTHER SHEET-METAL CASES, AND CUTTING SHEET METALS, ETC.—Bellina Froehlich, New York city. May 20, 1868.

1,661.—POWER LOOM.—E. B. Bigelow, Boston, Mass. May 20, 1868.

1,664.—MARKING AND CREASING TUCKS UPON A SEWING MACHINE.—Mary Ann Duffy, New York city. May 20, 1868.

1,684.—FRICTIONAL GEARING.—Albin Warth and Eberhard Faber, New York city. May 21, 1868.

1,689.—GRATE BAR.—A. C. Fletcher, New York city. May 22, 1868.

1,767.—MANUFACTURE OF LEAD PIPE AND LEAD PIPE LINED OR CASED WITH TIN OR OTHER METAL.—Wm. A. Shaw, New York city. May 28, 1868.

1,777.—PLATING SPOONS, ETC.—Marshall Forbes, West Meriden, Conn. May 29, 1868.

1,803.—PAPER SATINING MACHINE.—Thomas Christy, New York city. June 2, 1868.

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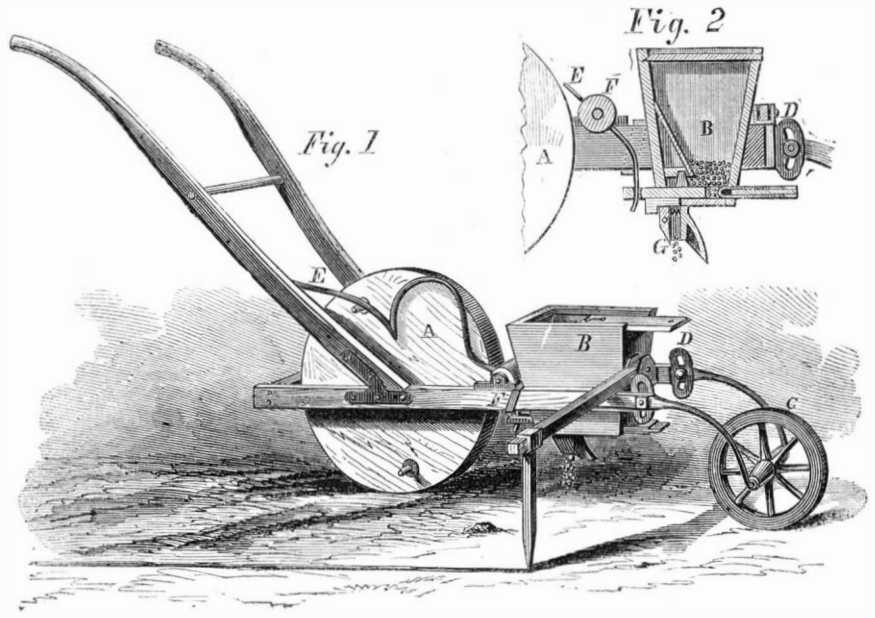
Improvement in Planting Machines.

Devices for diminishing the labor of planting corn and other crops are quite numerous, but not always satisfactory in operation from their complication or their difficulty of management. The accompanying engraving gives views of one of the simplest machines of this class that has come under our notice; cheap, easily managed, and not liable to get out of order.

Fig. 1 is a perspective view of the machine, and Fig. 2 a vertical elevation of the principal working parts. The frame is rectangular, with two guiding handles rising from its rear portion, between which runs a wheel, A, and carrying a hopper, B, which contains the corn or other seed to be dropped. The front part of the machine is sustained by a small wheel, C, the supports of which can be adjusted to the hight required by means of set bolts in slotted ears, D. In front of the hopper is a transverse marking bar with a pointer on the end to mark the ground for laying out the next row. This bar and pointer is hinged and adjustable so it can be at once changed to the other side of the machine.

In the bottom of the hopper is a slide, having an aperture through it, which can be adjusted, by an adjustable gage working in the seed slide, to deliver a greater or less number of kernels, or a greater or less amount of seed. The seed slide is actuated intermittently by a curved lever, E, its fulcrum being at F, one end engaging with the seed slide and the other being operated by pins on the side of the wheel, A. This wheel may be of any size required, and the pins may be placed as desired, the distance between the hills of corn be determined by these means. The wheel, A, may be changed quickly for one of a larger or smaller size. A hinged clapper or valve, operated by the lever which moves the seed slide, and by a suitable spring, closes the delivery spout, G, while the machine is passing from one hill to the other and opens it for the delivery of the seed when the spout arrives at the proper spot for placing a hill.



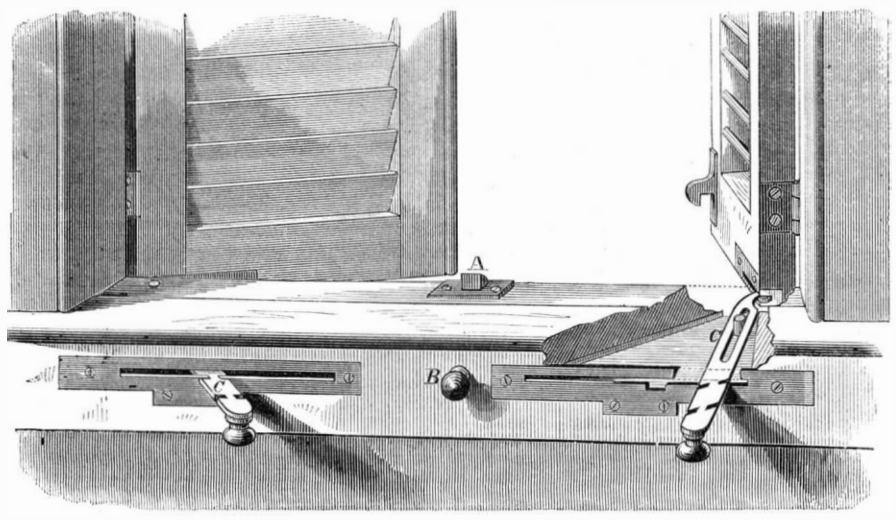
FISH'S PATENT CORN PLANTER.

Patent obtained through the Scientific American Patent Agency, May 12, 1868, by Wm. H. Fish, Jr., who may be addressed at Scarsdale, Westchester Co., N. Y.

Improved Device for Opening and Closing Window Blinds.

The annoyance, and even danger, of having to lean out of the window for the purpose of unfastening and closing an open blind, and the necessity of opening the window in the most inclement weather, either for closing or opening, seem to give peculiar value to any device by which this annoyance and danger may be avoided. The plan illustrated in the annexed engraving seems to be effectual in permitting the manipulation of window blinds from the inside of a room without raising the window.

Centrally, in the window sill, is a catch, A, operated by the knob, B, which depresses the catch when pulled, while the catch is returned to place by a common spiral spring. This catch secures the blinds when closed. To the rear bottom portion of each leaf of the blind a bar or lever, C, is attached by a hook engaging with a metal plate recessed into the blind. This bar passes through a recess in the window sill and terminates in a knob inside the room. The bar or lever has slots which engage with the edges of a metallic plate let into the inside face of the window sill, and secures the blind wholly open, or held at any angle desired. Except the central catch, no springs are used, and as all the parts are secured from the the weather, no opportunity for injury or disarrangement occurs. The knobs projecting into the room may be made ornamental. The device appears to be well adapted to the purpose designed.



SOLAN'S PATENT BLIND OPENER.

Patented by John Solan, Dec. 18, 1860. For further particulars address Maj. W. B. Richards, at Hoy, Kennedy & Co.'s, No. 111 Liberty street, New York city, or Geo. W. McGovern, Richmond, Va.

WATER BLOWING THROUGH ENGINE CYLINDERS.

A correspondent mentions some of the facts attendant upon the collapse of a boiler in the foundery of Wood, Frisbie & Co, Newburgh, N. Y., and gives his opinions upon the accident. We give his statements in brief, with some remarks. He says:—

"The boiler was twenty-four feet long, four feet in diameter, with two fifteen-inch flues. I examined the boiler and found the heads bulged out about three inches, as far up as the fire surface. The flues collapsed their entire length, and were broken at each end. The iron was scaled by heat. The upper half of the boiler was as perfect as new. The boiler was set about on a level with the engine, the steam pipe leading to the cylinder somewhat in the form of a siphon. The steam was about thirty-five lbs. pressure, the fires new and of intense heat, and the water known to be at the third gage cock.

"I account for the collapse, that it was caused by a want of water in the boiler, and that the water was instantly drawn from the boiler without the knowledge of the engineer. I have seen the water issuing from the escape pipe with such velocity as to have emptied the boiler in a very few minutes, and this occurs frequently on high pressure boilers with small steam room. The syphon-like form of the steam pipe, from the boiler to the engine cylinder would tend to draw the water from the boiler when once started. The main difficulty is to ascertain the exact time, and to know the cause of the water flowing out of the boiler, through the cylinder and escape pipe. This generally happens when the water is high in the boiler, with a low pressure of steam, and the steam room occupied by water so as to leave small steam space, not sufficient to supply the cylinder. Most of the explosions happen in about one, or one and a half hours after the engine has started, as in this case. In the cases of the explosions of the *Metropolis*, some thirteen years ago, *John J. Roe*, in 1861, the *Princess*, in 1860, the *St. Nicholas*, and the *Sultana*, the water was seen to issue from the escape pipe before the explosion took place."

We agree with our correspondent that this was a case of low water, if, as stated, the flues were so heated as to be scaled. But if the water was "instantly drawn from the boiler," there would seem to be not much opportunity to form heat scales. We have grave doubts about the water escaping through the engine as rapidly as the statement of our correspondent would imply. The heads of the cylinder, the crank, or bed would be broken, or the connections crippled; beside, the pounding of the piston would probably have been heard throughout the foundery. If the water had gone off as stated, there could hardly have been time left to heat the flues sufficiently to scale them. Our opinion is that the supply of water by the pump was insufficient to furnish the requisite amount for the generation of steam, and that the scaling was the result of a radical and long continued difficulty of this sort.

A reliable low-water detector and reporter (and there is such in the market) would, in this case, have prevented the collapse, if the flues had been of sufficient strength to resist the boiler pressure.

CASKS.

Casks have been used from a very early period, and the cooper's art is accordingly a very old one. Many improvements in the method of their manufacture have been introduced during the last twenty-five years, such as machines for cutting heads, staves, and bungs, but the cask itself remains in all its essential features the same as it was a century ago. Certainly, anything must have attained to a high degree of perfection, if it could pass unchanged through a century of such development in the mechanical arts as the present has been; still more is it remarkable of a thing so universally used as a cask.

We believe that there is nothing in general use which comes nearer a perfect adaptation to all requirements than the homely and useful article about which we are writing. It is hard to say whether some of its features of utility were originally incidental to facility of construction, or whether they were not directly sought after for their own sake. The form of the cask is a truncated, oblate spheroid. The conveniences of this form are the attainment of a base upon which the cask will stand firmly, and, at the same time, perfect facility in movement when it lies upon its side. Theoretically, when in the latter position it rests like a sphere upon a single point. It can then be whirled about upon its vertical axis with the application of a very slight force, or rolled in any direction. We say rolled in any direction—it may be rolled endwise. Of course, the flat ends, or heads, interfere very much with the process, but a cask may nevertheless be rolled longitudinally, with a very much less expenditure of force than a cylinder of the same weight.

In our youthful days, we were very much impressed with the performances of a rustic Sampson, who used to "end up" very heavy casks with one hand, by taking advantage of a rocking motion which he imparted to it, and applying his strength in full force at the moment the cask rested upon a point very near the chime. What then appeared to us wholly a feat of vast strength, we now know to be dependent in a a great measure upon the application of sleight.

Another advantage resulting from the spheroidal form of casks, is that they may be rolled easily over uneven surfaces without deviating from the direction of the motion imparted to them, a great convenience in placing them in proper positions upon decks of vessels, or moving them about upon wharves.

Great strength also results from this form, as the force of any external blow is transmitted to, and distributed over all parts of the structure.

A familiar conversation with a friend, in which he claimed that the advantages of the spheroidal form were obtained incidentally, the probable original design being merely to obtain a form in which the staves could be held together by the hoops, suggested this article. We stated in reply to his views, that the hoops would be retained, and the staves would be held by them as well, if the cask were given the form of the Dutch churn with two heads. It is easy to see, however, how the advantages, which are peculiar to the spheroidal form, would be all lost if the shape of the churn were substituted for it.

On the whole, there are few things that answer their purpose better, or give more evidence of perfection resulting from design, than casks.

A Noble Benefaction.

The English papers unite as with one voice in lauding the liberality of one of their most eminent mechanical engineers, who has lately founded thirty scholarships, each of the yearly value of one hundred pounds sterling, these sums to be applied for furnishing as many young men of English birth with advanced instruction in mechanical science and practice. The author of this benefaction is Mr. Joseph Whitworth, whose system of gages is generally accepted as a standard in this and other countries, but whose name is perhaps even better known because of his great attention bestowed of late years upon the construction of ordnance, and his exhaustive experiments on rifled guns and ammunition.

The object in making this princely endowment is to advance the cause of technical education, and the promotion of engineering and mechanical industry in his own country. In competing for these scholarships, proficiency must be shown in the use of one or more of the following classes of tools: the ax, file, saw, and plane; hammer and chisel, and the forge; as also a satisfactory knowledge of the elementary mathematics and mechanics, practical and descriptive geometry, and free hand drawing. By making these requisites, the student, combining some practice with theory, and the artizan, who combines some theoretical knowledge with perfection of workmanship, start on fairly equal terms.

In carrying out the ideas of Mr. Whitworth, the successful competitors for these prizes may attend universities or colleges affording scientific or technical instruction, or he may travel and study abroad. As the full scholarships can only come into full operation by degrees, the founder proposes to make the fund which will ultimately be available for the scheme to be placed at the absolute disposal of certain towns and educational institutions in order that they may be awarded to youths who desire to be qualified to contest for the scholarships in May, 1869.

Beet Root Sugar.—During the last twenty-eight years, the production of the cultivation in France of the sugar beet root has advanced from 22,000 tuns to 222,000 tuns. The total annual product in European countries amounts to 638,500 tuns, and now produces more than one-fourth of all the sugar known to be consumed in the world. Indeed, the success now uniformly achieved on all sides shows that, though the same causes which long retarded the progress of the beet industry in France will more or less obstruct it elsewhere, nevertheless its ultimate triumph is certain in every country where it is introduced with care and cultivated with reasonable patience and skill.

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NEW YORK, WEDNESDAY, JULY 8, 1868.

Contents:

(Illustrated articles are marked with an asterisk.)

*Imorovement in Machines for Forming Rings, Watch Case Centers, etc	17	Reappearance of Brorsen's Comet	21
*What is Planchette?	17	The Trades of Animals	21
The Impossible in Constructive Science	18	The New Steamship Holsatia	21
Dangers in the Use of Photographic Chemicals	18	New Patent Extension Bill	21
Railroad Track Laver in California	19	The Secrets of the Ocean	22
New Cement—Liquid Glue	19	Decision in a Reissue Case	22
Paint for Stoves	19	Manufacturing, Mining, and Railroad Items	22
Strike at the Iron Works in Troy	19	Recent American and Foreign Patents	22
A "Devil Fish"	19	Answers to Correspondents	23
Microscopy and Cholera	19	Extension Notices	23
Editorial Summary	19	New Publications	23
Lightning on the Telegraph Wires	19	Inventions Patented in England by Americans	23
Morality of Employés—The Duty of Employers	20	*Improvement in Planting Machines	24
*Apparent Variation of the Steam Engine Crank	20	*Improved Device for Opening and Closing Window Blinds	24
*Connecting Shafts by Pitmans	20	Water Blowing Through Engine Cylinders	24
The Frictional Area of Millstones	20	Casks	24
Utilization of Waste from the American Process of Amalgamation	20	A Noble Benefaction	24
The Negative Slip of the Screw	20	Effect of Labor-Saving Machinery upon Wages	25
Mechanical Distribution of Electricity	21	Modern Telegraphy	25
Fire and Water	21	Abuse of the Franking Privilege	25
Long and Short Screwdrivers	21	Quality of Musical Sounds	25
A Question in Rowing	21	The Sutro Tunnel	26
Absorption of Gases by Charcoal	21	Recent Boiler Explosions	26
		Importance of Regular Habits	26
		Patent Claims	27, 28, 29, 30

EFFECT OF LABOR-SAVING MACHINERY UPON WAGES.

In a former article, we discussed the effect upon the relation existing between capital and labor, produced by the increasing use of labor saving machinery. Our present purpose is to show that the substitution of machinery for manual labor has greatly increased the rewards, or wages of labor. In our former article we endeavored to show, that in their effect upon the aggregate amount of labor required to supply the general demand, improvements calculated to decrease the particular amount of labor necessary to produce a single article of necessity or luxury, were rather, on account of the demand for greater quantities of such articles caused by the reduced cost of their production, to be called *labor creating* machines, than the reverse.

The history of all improvements shows that the introduction of machinery calculated to facilitate and cheapen production, has increased the demand for labor. This increased demand could, notwithstanding the increase of population, never have been met, if some of the improvements referred to had not been so great as to almost entirely remove the necessity for manual labor in certain occupations, and thus transfer the laborers from those fields to others where their services were needed. Another way in which the increased demand for labor has been met, has been by the creation of entire new classes of laborers. The employment of children and females to operate the machines which have created certain branches of labor, has been the only way in which such machinery could have been profitably introduced and worked. Should these and other classes of laborers, that labor-saving machinery has created, be withdrawn from the general stock, the effect upon the industrial interests of the world would be crushing.

The increased demand for labor has raised its price in the market. The law of supply and demand applies to this as to everything else; but if the effect of mechanical improvement is to increase demand, wages must increase also with every advance in the arts. We believe that in the future the march of improvement will be no less rapid than in the past, and consequently, from this cause alone we argue continued increase of wages.

But there is another law of increase that is just as potent as the law of demand and supply, and which should not be overlooked in forming correct opinions upon this subject. Wages, or rewards for labor, should not be estimated by current value in dollars and cents. Operatives never fail to see this point clearly when prices of provisions, clothing, and rents rule high; that is, they never fail to perceive it in its particular application to their own circumstances. When one dollar buys only two pounds of butter where it formerly purchased four, and when other articles have advanced in proportion, they at once realize that two dollars per day is no better than one was when prices were only half as high. But they fail, generally, to see the more general advance of wages estimated by the amount of the comforts of life that can be obtained for a given sum, that has been going on steadily in accordance with the constantly decreasing cost of manufacture. We have shown that with each new invention which enables a given amount of labor to increase its rate of production, a corresponding decrease of price takes place. This decrease of price has been so great within the last fifty years, that ordinary mechanics are now enabled to live in a style that formerly was possible only to the moderately wealthy. Fifty years since, a mechanic wore the coarsest fabric, and ate the plainest food, because he was obliged to do so. His house was destitute of carpets; its furniture was such as he now would be ashamed to exhibit to his friends. A piano would have been beyond the most extravagant hopes of his ambitious daughters. Books were few and costly; newspapers were so rare that when one was obtained the whole neighborhood congregated to hear it read. Facilities for travel were few and expensive. Family portraits entirely out of the question. The most limited education was all that he could hope to give his children; and the long hours of his daily toil were uncheered by the ameliorations which are now considered essential in every well-ordered workshop. All these things are now within the reach of the mass of mechanics, and it is not too much to say, that if the things which were formerly considered luxuries, but which are now from long habit considered necessary, were avoided, and mechanics should limit their expenditures to the supply of such articles as would have contented a mechanic's family half a century ago, their savings would be more than treble what artizans could have made at that period.

In view of these facts, we believe Trades Unions, as permanent organizations, are, to say the least, unnecessary, and we believe them to be hurtful to the best interests of operatives in all branches of manufacture. We believe it must soon appear that the tendencies of such organizations are injurious to the best interests of the working classes.

MODERN TELEGRAPHY.

"Modern Telegraphy" is the title of a considerable pamphlet recently prepared by Prof. Morse for the purpose of correcting some errors respecting the origin of the recording telegraph.

It appears that Great Britain has recently conferred knighthood upon Charles Wheatstone for establishing the telegraph "not only in the United Kingdom but also throughout the whole civilized world." To say the least, this appropriation of the invention of the telegraph to the credit of Prof. Wheatstone, is a cool proceeding. It might, however, pass unnoticed but for the fact that the United States have a counter claim to set up in behalf of one of their own distinguished citizen, Professor Morse, who shows in the pamphlet now before us, that the means and process of imprinting or recording signs automatically by an electro-magnetic arrangement, were devised by him, and that this was the first realization of a telegraph in the strictest sense of the word. The American system of communicating at a distance is a TELEGRAPH, and we believe it was the first telegraph. The English system, on the contrary, is simply a SEMAPHORE or sign telegraph, which does not propose or pretend to imprint or record.

The two inventions are not identical. But even admitting that they are, which no scientific man will contend, Morse claims priority of discovery. The American telegraph was invented in 1832, and exhibited in 1835. The English semaphore was devised by Cooke not earlier than 1836, therefore Morse has the precedence.

In opposition to the assertion that Wheatstone has established the telegraph throughout the civilized world, the facts are a complete refutation of this claim. The American telegraph system is established throughout the Western Continent, not merely in the United States, in Mexico, South America, and the West India Islands, but in Canada and the British American possessions; it is the system adopted in the British Colonies of Australia and of India: it is the system adopted by the International Telegraph Convention of 1865, in Paris, in which all the principal nations of Europe were represented (except England); and thus the "whole civilized world" (with the above exception) appear to have unanimously adopted the American telegraph, and have acknowledged their obligations to the American inventor by designating it the "Morse System." The English semaphore is not used out of the United Kingdom, and if we mistake not, even there it is gradually being superseded by the Morse system, which is extensively used, but generally without acknowledgment.

Prof. Morse has maintained his claims legally against all comers, and it will not do now to undertake to rob him of those rights by conferring honors upon others.

ABUSE OF THE FRANKING PRIVILEGE.

Our attention has been frequently called to the subject, and our observation confirms the fact, that Members of Congress are in the habit of franking letters and circulars for their friends to a large extent, and thus rob the Post Office Department of a considerable portion of its revenue. Claim and Patent Agents seem to be among those most favored by our Honorable Congressmen. Formerly it was required of those entitled to the franking privilege that they should *write* their names on the envelope, but latterly the custom of using an engraved *fac simile* of the signature has become general, and thus the M. C. is relieved of the onerous task of doing his own franking.

A boy can, with the convenient modern hand-press, print many thousand signatures in a very short time, and probably the office boys of some of those Claim and Patent Agents who flood the country with their printed circulars are permitted to do this printing for their employers. We do not know that this is so, but if some of the M. C.'s do the presswork on all the envelopes that are mailed with their *franks*, they are more industrious than the public generally accredit them.

We are led to call public attention to this abuse of the franking privilege, not at all because it is a new feature, but at the suggestion of an indignant correspondent, who sends us a twenty page advertising pamphlet of a Washington Patent Agent, mailed to him under the frank of Hon. John A. Logan, M. C.

We find, by referring to the postage account of the SCIENTIFIC AMERICAN Office for the year ending in May, that we have used over $6,000 worth of postage stamps. Supposing it were generally known that a dozen or two of like stamp-consuming firms should obtain permission to use the franking stamp of some Honorable M. C., would not the public be justly indignant, and feel that the postal department was being defrauded?

Of the extent to which the franking privilege is used and the extent to which it is abused, we believe the public have but slight conception. Were it not that it is the legislators themselves who keep the law in force, we should hope to see it speedily repealed. But as it is, there is no hope of that, and but little probability that any notice will be taken of the fact that the custom of franking for business firms is becoming more and more general.

QUALITY OF MUSICAL SOUNDS.

A difference of opinion seems to exist among savants, as to the cause of peculiar qualities of different musical sounds, exclusive of pitch and volume. Prof. Tyndall attributes the difference of quality to the harmonic sounds which attend all musical tones, and says that in the organ the overtones (the name given by him to the tones hitherto known to musicians as harmonics) are felt to be so necessary to a good musical clang, that they are introduced by small pipes. He also asserts that the vowel sounds are due to accompanying harmonics.

On this side of the world, other views are advocated. In the *American Journal of Science and Arts* for May, an excellent article upon the Musical Ratios, by Prof. H. W. Poole, contains an allusion to a proposition laid down by Prof. Tyndall, and strong objections are urged against it.

Mr. Poole argues that the pleasant quality of a sound depends greatly upon its purity, both as regards pitch and its freedom from the harmonics, which Professor Tyndall considers so desirable. He remarks that it was considered "a triumph when the pianoforte was made to give less of the jangling harmonics, and more of the pure fundamental tone of the string."

Without assuming to be arbiter of the opinions entertained by men so distinguished in this department of science, we incline to the views of Prof. Poole. We believe the quality of different musical sounds consists partly in the manner in which vibrations, independent of rapidity or amplitude, are transmitted to the sensorium, by the delicate and as yet unexplained mechanism of the internal ear. We base this opinion upon the fact that the internal ear does at times produce within itself certain sounds not dependent upon external causes. Every one has experienced bell-like, ringing sounds, or buzzing and sibilant noises, that are the result of deranged action of the auditory apparatus. These sounds sometimes last for days, after the ear has been stunned by an explosion; and sometimes they may be heard, for a few moments, when no external cause can be assigned, ceasing often for a short time to recommence in another form. Our theory is, that when any musical sound is produced, the ear in its transmission qualifies it according to the nature of the minute wavelets of air which are produced by the texture of the vibrating body. Thus a violin string, when so much worn that many fibers exist upon its surface, gives a peculiar harsh and muffled tone, as though the bridge were weighted with something that interfered with its vibration, only in a less degree. The harshness of the sound of filing, also, is probably caused by the clashing of minute waves of air, emanating from the teeth of the file. We have often noticed in the filing of a bar of steel, that the harshness of the sound ceased with the removal of the file, the bar continuing to vibrate in a clear, musical tone for some time after. In the filing of saws we have also observed that the purity of the tone produced after the file was removed, was greater in large saws, having but few teeth in proportion to the extent of their surface, which seems to show that the waves produced by the teeth, like those produced by the fibers of the worn string, tend to give harshness to the tone produced.

When the bridge of a violin is damped, a very peculiar quality is imparted to the tones, yet each string retains all the harmonics which it originally possessed.

We conclude, then, that the characteristics of musical sounds, other than pitch and volume, depend upon the texture of the sonorous body by which they are produced, and the modifying influence of that part of the mechanism of the ear, the office of which is yet undetermined.

All the modifications of sound which characterize the vowel sounds, may be given in whispers, yet we do not think that whispers can be considered as musical tones. It is possible to speak, but not to sing in whispers. We cannot, therefore, accept the theory that absence or presence of the harmonics is the cause of difference in vowel sounds.

Neither do we accept the theory that harmonics are necessary to the production of good musical tones. On the contrary, they so frequently seriously interfere with good harmony, that the softening effect of distance, which renders them imperceptible, is universally acknowledged to add sweetness to music. Spohr, in his celebrated "School for the Violin," says that "the artificial harmonic tones must be rejected, because they so totally differ from the natural tones. It would be degrading this noble instrument to play whole melodies in such childish foreign tones." He, therefore, rejects all harmonics except those natural to each string, namely, the octave, the fifth of the octave, and the double octave.

The thorough investigation which is now in progress in the science of acoustics, will undoubtedly soon throw light upon some of these perplexing questions, which constitute one of the most interesting scientific topics of the time.

IT has recently been discovered that cheap claret wines in France are adulterated by alum, which produces gastralgia.

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THE SUTRO TUNNEL.

The silver vein known as the Comstock Lode, situated in the State of Nevada, is probably the most important gold and silver bearing vein now worked. Its yield, during the six years ending Jan. 1, 1868, was $75,000,000. Its present annual yield is $16,000,000, but owing to the depth now reached, and the high price of fuel, the expenses for pumping have become so great, that very small profit is realized by the Companies (thirty-five in number,) now at work upon it. The $16 000,000 now produced involve an expenditure of almost the entire amount to cover the expense of raising ores, pumping, etc.; and these expenses are increasing so rapidly, with increasing depth, that unless something can be done to obviate the present difficulties, attending the working of these mines, their total abandonment, at an early period, is inevitable. Forty-seven engines are now at work to keep them free from water. The fuel for these engines is wood, and costs, delivered at the mines, sixteen dollars in gold per cord.

In view of such facts, it has been proposed to open a tunnel called the Sutro tunnel (because projected by M. Adolph Sutro), which shall cut the Comstock Lode 2000 feet below its highest point, for the purpose of draining and ventilating the mines, and transporting ores therefrom to a point upon the Carson River, where their concentration may be cheaply and conveniently accomplished.

The estimated cost, including a large margin for unforeseen contingencies, is $8,000,000, and its dimensions are as follows:—

Length of main tunnel	21,178 feet.
Aggregate length of branches	17,688 "
Aggregate depth of shafts	4,220 "
Total	43,086 "

The section of the tunnel is twelve feet square, and is intended to afford passages for two lines of cars, each car having a capacity of five tuns. A drain beneath the roadway of the cars will carry off all the water from the different mines.

The advantages of such a tunnel are so great, that some time since the several mining companies at work upon the Comstock Lode were induced to take $365,000 stock in a company then organizing for the purpose of constructing it. The whole amount of capital stock was placed at $5,000,000, and it was thought that if $500,000 of it were taken by the mining companies themselves, the remainder would be easily secured from New York capitalists. Unanticipated difficulties have, however, been realized in the attempt to raise the required capital. So many such projects have proved themselves mere schemes to procure profit to their projectors at the expense of those who have been induced to invest in them, that, added to the general distrust which seems to pervade money centers, in regard to mining operations, the effect has been adverse to the success of the Sutro Tunnel enterprise.

The State of Nevada, although extremely anxious to aid a work so important in its bearings upon her future destiny, found herself restrained from so doing, by constitutional inhibitions. Nothing remained but to memorialize Congress, and ask the aid of the General Government, which was accordingly done by the legislature of Nevada, Jan. 25, 1867. The memorial was referred to the Committee on Mines and Mining, who reported a bill June 3, 1868, providing for the loan of government credit to aid the construction of the proposed tunnel. The bill and report were ordered printed, and now await further action. We have given some attention to the merits of this subject, and we are convinced that the Sutro tunnel, if constructed, is destined both directly and indirectly to benefit the whole country. Directly, by largely increasing the amount of bullion, thereby cheapening money, which amounts to the same thing as decreasing our national debt; and indirectly, because it will ultimately put an end to what has been so properly characterized as "Piratical Mining" in this country, and initiate in its stead a permanent and effective system.

There can be no doubt remaining in the minds of experts about the continuity of the Comstock Lode to depths beyond any that can be worked. There is also little doubt that other veins than the Comstock would be crossed by the Sutro tunnel; but capitalists who are not conversant with the facts upon which these opinions are based, can be convinced of their truth only by ocular demonstration. It is of little use to talk to them about "true fissure veins," and the like; to them "seeing is believing," and faith in the continuity of gold and silver veins to great depths being once established upon sight, would, by initiating a rational system of mining, develop such an extent of mineral wealth as would command the admiration of the world. We should no longer pursue the wasteful and ruinous system of surface mining which has prevailed to such an extent hitherto, but ores that have heretofore been considered too poor to be profitably worked, would be made to swell the amount of the precious metals at present produced. That we have not overestimated the benefits of deep tunnelling, will be seen when we state that the Comstock Lode is estimated by the best authorities in Europe and America, as being capable of a yield of $50,000,000 per annum, upon the completion of the tunnel; more than three times the amount at present produced.

So far are we from believing that our Government should hesitate about establishing a precedent in the assistance of mining enterprises, that we think it has hesitated too long. The history of the internal improvements of almost every other nation goes to show unmistakably, that until such enterprises are fostered by the general Government, nothing like a full development of mineral resources will be attained. We believe however that the Government needs but to demonstrate the feasibility of deep tunnelling in this country, in order to turn the flow of private investment into similar channels.

The securities offered the Government for the loan, are such as to justify its negotiation. We see then nothing that can be considered a valid argument against the passage of the bill reported by the Committee; on the contrary, we see so much that renders it desirable that we trust it will speedily become a law. The interests not only of one section or of one industry are involved in the success of the Sutro tunnel, but all sections and all branches of industry are involved in common.

That such a measure should meet with opposition, is only what is to be expected in an enterprise of such magnitude. The improvements from which the United States as a nation, and the several States have individually received the greatest benefit, met with the most violent opposition at the outset. But as the opponents of the measures alluded to have been put to shame by the utter failure of their predictions, so we confidently believe, will those who have set themselves to oppose the Sutro tunnel, eventually be compelled to acknowledge their want of judgment and foresight.

RECENT BOILER EXPLOSIONS.

From a correspondent we have an account of a destuctive steam boiler explosion which occurred at Westphalia, Clinton County, Mich., June 15th, by which an extensive flouring mill was destroyed and one man killed and two others injured. Our correspondent says he examined minutely the wreck. The iron was rent as though it were paper; the seams were started in many places, the rivets being pulled partially through, or cut off in the seam, in the latter case leaving them smooth and bright. In some cases the rupture was parallel with the seams, not four inches from them. The dome or steam chamber and safety valve, placed about midway of the boiler, and weighing about four hundred pounds, was thrown a distance of thirty rods, and evidently went to a great hight. The boiler was fifteen feet long, five feet in diameter having eighty-threeinch flues, had been used two years, and run two engines of forty and thirty-five horse power. At the time of the explosion only one was running, driving a saw, planer, etc.

The engineer says he had just pumped water to the second cock and had, according to the gage, fifty-five lbs. of steam, and was letting the steam down preparatory to going to dinner. The boiler was broken into eight large pieces beside smaller fragments, and the flues and the debris were scattered in all directions. The boiler had evidently burst at the middle, as the ends lay about sixty feet each way from the arch. The pieces which had formed the lower side appeared to have been exposed to great heat. The safety valve was stuck fast.

EXPLOSION OF A STEAM FIRE ENGINE.

At a fire in the Bowery, New York city, on the evening of June 18th, one of the steam fire engines, of the Metropolitan Fire Department exploded her boiler, causing the death of six persons and wounding over a score. The explosion occurred just after the engine was started succeeding an interval of rest. At the time of this writing the official examination and report has not been made, but we made a personal examination of the engine the next morning. The rupture occurred on that side of the fire box opposite the inlet pipe. The inner skin of the water leg was torn, the rivet heads broken off, and the sheet itself bent up on the torn edges. The crown sheet did not appear to be burned, as it had a coat of soot. From appearances low water and the injection of cold water on the heated plate were the probable cause of the explosion. The safety valve appeared to be stuck to its seat, but this may have been caused by concussion when the engine struck the pavement after being overturned. The official investigation is not concluded as we go to press, and that may throw more light upon the matter.

TUG BOILER EXPLODED.

On the morning of June 20th, the boiler of the tug *La Verne* exploded while rounding the Battery, New York harbor, having in tow a lumber barge. As the vessel sunk a few minutes after the accident, we have no data derived from examination of the boiler to guide us as to the cause of the accident. We copy a notice of the catastrophe from one of our dailies, the New York *Sun*:

The crew were thrown by the violence of the shock into the water, and with the exception of one were rescued; but all were more or less injured by the sad mishap. The mate, Henry Lynch, who was steering the boat at the time of the disaster, has not since been seen, and it is feared he was either blown to pieces, or sank with the vessel. The Captain, David Decker, who was near the boiler when she exploded, was only slightly bruised and scalded, and, although thrown from his feet by the shock, was enabled to escape in a boat before the vessel went down, which happened soon after the explosion. The engineer, Daniel Taulman, was blown over the side of the vessel, and sank; but on rising to the surface he was rescued by the boatman who had gone out to the help of the sufferers. He was very seriously injured, his left arm being badly scalded and cut, and his leg severely bruised. He had but a few moments before left the engine room to speak to the captain, and he states that the steam was only 74 pounds to the inch—three pounds below the fixed limit—and that there was plenty of water in the boiler. He had examined the gages but an instant before the boiler burst, and therefore could not account for the mishap. John Lewis, the steward, was forced nearly fifty feet into the air, and then fell into the water, whence he was rescued by the boatman. He received a compound fracture of the arm, a severe scalp wound, and had his face fearfully lacerated. His condition is thought to be critical. Edward Wilson, a deck hand was blown over the side of the boat, but received no serious injuries, and James Burke, the fireman, was but slightly hurt. The more severe cases were promptly taken to the New York hospital, where every care and attention was given to the sufferers.

The Captain, in his statement, alludes to a leaky rivet in the boiler, which defect he had previously pointed out, but which was not considered by the authorities to be of any serious consequence. He also states that the vessel was not was not at the time under a full head of steam, and further, that no recklessness of conduct was manifested by either himself or the engineer. In fact, all the statements agree in one thing, and that is, no satisfactory reason can be assigned for the explosion. The propeller was not an old boat, and her boilers had recently been overhauled and repaired. They were furthermore cleaned out that morning, and could not therefore, have been encrusted with rusty or saline matter.

One thing will strike the practical engineer queerly, that in this, and many other accounts of boiler explosions, it should be thought necessary to apologize for, or, at least, to mention the fact of a leak in the boiler. We cannot conceive that a leak in a boiler can in any way tend to an explosion. That the leak may deaden fire or diminish the pressure of steam, or that it can aid in a *rupture* is possible, but that it tends to an explosion we have yet to learn.

IMPORTANCE OF REGULAR HABITS.

A person visiting New York for the first time, and curious to observe the peculiarities of the metropolis, would probably immediately notice the great number of restaurants, eating houses, and stands in the markets and streets, loaded with eatables. Go where he would, by day or night, he would find accommodations for eating, and people availing themselves of them. The facilities thus afforded for obtaining meals at all hours, are, without doubt, leading to great irregularities in eating, and thus exciting a deleterious influence upon the public health. It may, therefore, not be amiss to devote a brief space to the consideration of the effect of all irregularities in habits of living upon the animal economy.

It is a fact well recognized by physiologists, that the constitution of living beings possesses a recuperative power that is capable of resisting attacks from external agencies, or, rather, is able to restore the damage caused by such attacks. The lower in the scale of existence an animal is found, the stronger is the power of its organism to restore parts removed by mechanical means, and the less is its susceptibility to the influences which cause disease. If from individuals of the lower orders of animal a limb, or even a portion of the body be removed, a new one will grow in its place, and in many cases the part removed will supply the necessary parts which are absent, and become a complete organism. In vegetables this is almost universally the case. and the propagation of plants by slips cut from the parent stem, is a process of daily occurrence in horticulture. The recuperative power is indeed so great in many plants that they can, by the most extreme efforts, be scarcely removed from a soil where they have once obtained a foothold. The plant known to farmers as Quack-grass is a good example.

The power to restore parts which have been lost extends to the highest orders of the animal creation. Teeth which have been removed by mechanical means have often grown again in the human jaw years after the second set which take the place of the first, in the regular course of nature, had been supplied. This is, however, probably the only organ that the human recuperative energy has power to restore.

As age advances, this power becomes less, so that repair takes places slowly, and in very advanced age ceases altogether. Broken bones refuse to unite, and abrasions of the skin become chronic ulcers.

There is, however. a striking characteristic of the power of recuperation, which has a most important bearing upon the health, both of men and animals. It is this: The power to restore increases with the regularity of the power and periods of attack. It is as if the constitution a were citadel, upon the reduction of which two kinds of tactics were employed. So long as the attacks are made at regular intervals the garrison may sleep while the besieging forces are withdrawn, and rise refreshed to increased resistance; but attack it at unexpected times, and with irregular force, and unremitting vigilance must at last wear out the strength of the besieged.

Many phenomena which cannot be accounted for in any other way, at once find an explanation by the application of this truth. A man who is addicted to the use of alcoholic liquors may often drink very freely for years without any apparent serious detriment to health, if he is regular in the times and quantities of his potations; while another, who only takes an occasional "spree," will suffer from the consequences of his indulgence.

The taking of proper exercise, pure air, sustenance, sleep, and recreation, may be compared to the withdrawal of the attacking forces. If the withdrawals are regular, the attacks will also be regular, and the resisting power of the vital structure will in the meantime have accumulated.

We believe that six hours of sleep per diem, begun and ended at uniform times, are as good as eight taken at irregular periods. It follows, then, that regular sleep gives two hours at least more time per day, available for business, pleasure, or study, than can be otherwise obtained.

In short, nothing is so economical as regular habits. Less food, less sleep, less clothing, less medicine is required to sustain nature, and better health, more happiness, more wealth, more knowledge, and longer life are obtained in their exercise.

SHADOWS FROM TRANSPARENT BODIES.—By means of the electric light a piece of glass can be made to throw a perfectly black shadow. This will be the result provided the two surfaces through which the ray passes are not perfectly parallel, the deepness of the shadow depending upon the variation.

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OFFICIAL REPORT OF PATENTS AND CLAIMS

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79,048.—CARBURETER.—Henry C. Appleby, Conneaut, Ohio.

I claim, 1st, Discharging a current or currents of air into hydrocarbon liquid, by centrifugal force, substantially as and for the purposes described.

2d, In combination with a carbureting apparatus, the valve, l, operated by the weighted lever, J, and the serrated disk, H, substantially as and for the purposes described.

79,049.—DEVICE FOR GRINDING TOOLS.—Daniel W. Ayres, Sheldon, Ill.

I claim an implement for grinding or sharpening tools, composed of a stock, gearing, and winding wheel, one or more, arranged to operate in the manner substantially as shown and described.

79,050.—LOUNGE.—Lewis H. Baker, Tarrytown, N. Y.

I claim in combination with a furniture lounge, an extension or folding washstand, arranged and operated substantially as described.

79,051.—SELF-LOCKING SHUTTER HINGE.—E. H. Benjamin, Oak Hill, N. Y., assignor to Gifford, Potter and Company.

I claim, 1st, The reversible pintle plate, P, provided with a curved recess, the pintle, F, and pin, f, and adapted to be secured to the arm, b, of the right-angled plate, B, by means of the tongue, i, and screw, k, all constructed and arranged as described, for the purpose specified.

2d, The perforated projection, G, cast upon the plate, A, and provided with the notched rib, z, and semi-circular extension, r, in combination with the recessed pintle plate, P, and right-angled plate, B, having the stops, S S', all constructed and arranged as described, to produce a reversible shutter hinge, as herein set forth.

3d, The semi-circular rib, q, or its equivalent, substantially as shown and described, in combination with the screw, k, and the pintle plate, P, for the purpose of holding the latter firmly, all as set forth.

4th, The tongue, i, of the pintle plate, P, or its equivalent, substantially as shown and described, in combination with the slotted projection, b, for the purpose of permitting the firm attachment of the pintle plate, all as set forth.

79,052.—CARPENTERS' GAGE.—A. H. Blaisdell, Newton Corner, Mass.

I claim the fingers, E E, pivoted on the sliding block, C, and operating so that their four ends will always remain in contact with a curved or straight edge, substantially as herein shown and described.

79,053.—PRINTING PRESS FRISKET.—T. W. M. Castle and J. B. Conner, Adriance, Ind.

We claim constructing the frisket of the parts, D D, attached to the tympan, A, substantially as shown, in combination with the pulleys or semi-pulleys, F, springs, E, levers, G G, and the prongs, e e, all arranged and applied to operate in the manner substantially as and for the purpose set forth.

79,054.—RAILWAY.—John G. Cross, Brattleboro, Vt.

I claim, 1st, The rails, A, formed with rounded heads and branched or arched bases, and having their ends halved vertically to overlap and fit upon each other, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the two-tie chair, B, having a sub-rail, C, formed upon or attached to it, with the overlapping ends of the contiguous rails, A, substantially as herein shown and described, and for the purpose set forth.

3d, The sub-rail, C, made solid with and upon the chair, B, substantially as herein shown and described, and for the purpose set forth.

4th, The detachable sub rail, C, secured to the chair, B, by means of the lug, b3, formed upon the outer lip, b2, of said chair, and entering a notch or opening in the lower edge of said sub-rail, substantially as herein shown and described.

5th, The ends of the main rail, A, having its ends secured to the sub-rail, C, and to the chair, B, by the bolts, D, and wedge keys, E, substantially in the manner herein shown and described, and for the purpose set forth.

79,055.—CONNECTION FOR SOFT METAL PIPE.—Isaac Davis, Brooklyn, N. Y.

I claim a lead pipe connection, consisting of the screw clamps, C D, applied over flanges, a a, and packing, all substantially as and for the purpose set forth.

79,056.—GRIDIRON.—Clayton Denn, Frankford, Pa.

I claim, 1st, The gridiron, A, constructed substantially as and for the purpose described.

2d, The combination with the gridiron, A, of the cover, F, substantially as and for the purpose described.

3d, The combination of the gridirons, A and L, and the cover, F, substantially as and for the purpose described.

79,057.—HARVESTER RAKE.—H. F. W. Deterding, Alton, Ill.

I claim, 1st, The wheel, I, rack, J, gearing, c K L, and the shafts, M O Q, all arranged and applied as shown, or in an equivalent way, for the purpose of operating the endless chain, V, and rake, substantially in the manner as and for the purpose set forth.

2d, The pivoted plate, X, and spring, n, in connection with the recesses, o q, in the inner edge of the plate of the metallic framing, Q', and the bent rake tooth, h x, of the rising and falling rake, all arranged to operate with the slotted plate form, S, substantially as and for the purpose specified.

3d, The coiled spring, J, in combination with the rake head, i, and socket, W, whereby the rake teeth, h, are held in a vertical position, as herein described, for the purpose specified.

79,058.—HORSE HAY FORK.—H. L. Doane, Green Oak, Mich.

I claim, 1st, The swinging tines, E E G, constructed of one piece of metal, when the parts, E E, are crossed as shown, whereby their points are brought obliquely across the points of the fixed tines, as and for the purpose herein set forth.

2d, The two pairs of tines, A A, B B, each formed on one continuous rod or bar of metal, and hinged together by the cross part, G, and bent eyes, a a, all substantially as shown and described, and for the purpose set forth.

79,059.—HAT BLOCKING MACHINE.—Jacob Eberhardt, Newark, N. J.

I claim the brim preserver, consisting of the elastic annular plate, E, between the metallic annular plate, D, and frame, B, in combination with the elastic male die, A, and metallic female die, C, as herein described for the purpose specified.

79,060.—PASSENGER REGISTER.—John Enright (assignor to himself and James R. Del Vecchio), Louisville, Ky.

I claim, 1st, The combination of the doors or bars, F, shaft, B, radial arms, G, having stop pins, g', or their equivalent, attached to them, spring pawl, J, and bent lever, L, with each other, when placed at the entrance of a car, boat, room, or other place, substantially as herein shown and described, and for the purpose set forth.

2d, In combination with the above and with each other, the toothed wheel, V, attached to a shaft, S, having a single tooth or cog, E', formed upon it, and carrying an index finger, G', the toothed segment or wheel, B', carrying an index finger, i', the dial plate, H', lever or arm, R, pawls, W and A, connection, P, lever, O, rod, J, and gong, K', all arranged and operating as set forth for the purpose specified.

79,061.—CUTLERY.—R. H. Fisher, West Meriden, Conn., assignor to Beaver Falls Cutlery Co., Beaver Falls, Pa.

I claim, 1st, The bifurcated tang, B, provided with hooks, c c, fitting into the recesses in the handle, C, and secured in position by means of the bolster, D, fitting into the recesses, b b, and over the end of the handle, as herein shown and described.

2d, Securing the bifurcated tang, B, to the handle, C, by compressing the arms, a, and slipping the bolster, D, into the recesses, b, as herein shown and described.

3d, Securing the bolster, D, to the handle by means of the rivet, d, passing through the handle between the arms, a a, of the tang, substantially as herein shown and described.

79,062.—BEVEL SQUARE.—W. T. Fisher, Lenoirs, Tenn.

I claim, 1st, The arrangement of the fixed index, G, and movable index, H, with relation to each other, and the stock, A, graduated blade, B, and slotted protractor, D, whereby the required angle of the blade with the stock is determined, as herein shown and described.

2d, The described arrangement with the slotted stock, A, graduated blade, B, slotted protractor, D, fixed index finger, G, movable index finger, H, and set screws, E F, all operating as described, for the purposes specified.

79,063.—NECK TIE AND WATCH GUARD COMBINED.—Thomas J. Flagg, New York city.

I claim as a new article of manufacture the combined neck tie and watch guard, A, consisting of the widened part, a1, and the narrow part, a2 a2, the latter being adapted to receive the slide, a3, which is secured to the button of the shirt by its loop, a4, thereby holding the neck tie in proper position on the neck of the wearer, the ends, a2, being also provided with a suitable means for attaching to the watch, the whole constructed and arranged as herein set forth.

79,064.—TRACE BUCKLE.—Martin Gayhart, Young America, Wis.

I claim the parts, A A A' A", and B B B B', pivoted together by a rod, a, and provided with a rigid tongue, e, corrugated cross piece, A' and B', all constructed and operating substantially as shown and described, and for the purpose set forth.

79,065.—HORSE RAKE.—Jacob Ginther, Mier, Ill.

I claim, 1st, The described arrangement of the trip stick, d, having a ratchet, handle, g, foot, b, pivoted stop rod, e, and spring brace, f, with relation to the hinged bars, I, carrying the rake, A, said bars, I, being adapted to be elevated and lowered by means of the cord, a, drum, o, and lever, j, all as and for the purposes herein shown and specified.

2d, The combination of the ratchet rack and trip stick, substantially as described.

79,066.—HAMMER.—J. H. Goodwin, Scotland Neck, N. C.

I claim as an improved article of manufacture, the tool consisting of the combination of a hammer with graduated handle and tack claw, with a screw driver, constructed as described.

79,067.—SADIRON.—James Gray, Newark, N. J. Antedated June 18, 1868.

I claim, 1st, The cover, D, constructed as described, consisting of the plates b c, forming a cold air chamber, the upper plate being slotted for the passage of the arm, e, of the catch damper, G, as herein shown and described.

2d, The adjustable sliding damper, G, when arranged below or near the mouth of the smoke pipe, C, of a hollow, self-heating smoothing iron, substantially as and for the purpose herein shown and described.

3d, A self-heating smoothing iron, when provided with a perforated cap fixed in the interior of the hollow iron, with a double cover, D, and with an adjustable damper, G, all made and operating substantially as and for the purpose herein shown and described.

79,068.—WASHING MACHINE.—Wm. Hachenberg, Wild Pigeon, Mich.

I claim the combination of the curved sides, B, bearing the rollers, C, segmental rubber, E, whose journals, e4, are hung in vertical slots, slotted bar, F, connecting bar, G, lever handle, H, shelf, I, shaft, J, bars, K, and spring lever, L, all arranged as described for the purpose specified.

79,069.—BEVEL SQUARE.—C. O. Hansen, Memphis, Tenn.

I claim the bevel constructed as described, and consisting of the graduated plate, B, longitudinally slotted, the pivoted arms, A, links, C, and sliding clamp nut, D, all arranged to operate substantially as herein shown and described.

79,070.—LEATHER ROLLER.—J. T. Harris, Swampscott, Mass.

I claim the guards, D and E, either or both, and whether made separate or in one piece, in combination with the rollers of a leather rolling machine, substantially as herein shown and described, and for the purposes set forth.

79,071.—HOISTING APPARATUS.—Dexter Head, Medusa, N. Y.

I claim the lazy tongs, C, arranged to operate in connection with the derrick, A, slotted frame, B, the pulleys, cord, e, and windlass, f, as herein described, for the purpose specified.

79,072.—HOP STRIPPER.—Sidney Holt, Baraboo, Wis.

I claim, 1st, The combination and arrangement upon the frame, A, of the fixed and sliding bars, E F, respectively, substantially as and for the purpose set forth.

2d, The combination and arrangement, with relation to the toothed cylinder, J, of the endless carrier, D, rollers, B, and vertically adjustable hangers C, as herein shown and described for the purpose specified.

3d, The toothed bar, L, in combination with the toothed roller, J, substantially as and for the purpose herein set forth.

4th, The described arrangement upon one frame, A, of the hop-stripping device, consisting of the parts, E F G H I, the breaking device, J K L M N, and the endless carrier, D, passing around adjustable rollers, B, all constructed and combined to operate in the manner and for the purpose substantially as set forth.

79,073.—TOY CANNON.—Geo. E. Hutchinson, Cleveland, O., assignor to himself and J. B. Brown, Peekskill, N. Y.

I claim a toy cannon having an enlarged chamber, r, at the rear end of the bore and having the front end of the spring confined in a sliding barrel, E, in combination with the lever, F, and pin, d, all made and operating substantially as herein shown and described.

79,074.—HORSE POWER.—J. H. Kleppinger, Cherryville, Pa.

I claim the wheel, E, with the toothed face, and the loose wheel, F, with the pawls, b, all arranged as described, in combination with the shafts of a horse power, and with the fly wheel, H, mounted on one of them, as specified.

79,075.—HOT AIR FURNACE.—Wm. H. Lee and Charles M. Hardenbergh, Minneapolis, Minn.

We claim, 1st, The arrangement and combination of the furnace drum, A, (with the the vertical air tubes, a) the annular flue drums, C, the smoke flues, D and E, and the chimney flues, F and J, substantially as described for the purposes set forth.

2d, The partition plates, H, and damper, G, in combination with the furnace drum, A, annular flue drums, C, smoke flues, D E, and chimney flues, F J, as herein shown and described.

79,076.—SAFETY GUARD FOR MINING SHAFT.—E. O. Leermo, Gold Hill, Nevada.

I claim the combination with the railroad track and the cage of a mining shaft of the automatic safety guard attachment, substantially as and for the purpose described.

2d, The combination of the spring buffer, H, spring lever, E, and slide, D, substantially as and for the purpose described.

79,077.—SMUT MACHINE.—Carl Millar, Sandoval, Ill.

I claim the smut machine, C, with its screen, B, and blower, E, in combination with the brusher, G, blower, H, and screen, K, when constructed and arranged in the manner and to operate substantially as described.

79,078.—MANUFACTURING BUTTER FROM WHEY.—Ira Page, Adams, N. Y.

I claim the improved mode of manufacturing butter from whey, substantially as and for the purpose described.

79,079.—EXTENSION TRESTLE OR HORSE.—George H. Pierce and Martin T. Glimsetal, Mineral Point, Wis.

We claim, 1st, The traveling boards, B B', constituting the platform of trestle or horse, substantially as shown and described, in combination with the braces, a a a', and their respective bolts, r r r', all as and for the purpose set forth.

2d, The screws, G, in combination with the cross bar, i, and the hooks, f, substantially as shown and described, and for the purpose specified.

3d, The slotted girders, D D', in combination with the legs, A, platforms, B B', and bolt, r', substantially as shown and described and for the purposes specified.

4th, The plates, m, substantially as shown and described in combination with the braces h, and the slotted girders, D D', all as and for the purpose set forth.

5th, The cross bars, i, substantially as shown and described, in combination with the legs, A, braces, h, and slotted girders, D and D', all as and for the purpose set forth.

6th, The cross bars, i, substantially as shown and described, in combination with the screw, G, and legs, A', all as and for the purpose set forth.

7th, The brace, a', when combined with a guide, a'', and bolt, r', all constructed and operating substantially as shown and described and for the purpose specified.

8th, The hooked and hinged cross bar, i', substantially as shown and described, in combination with the legs, A, slotted girders, D D', and platform, B B', all as and for the purpose set forth.

9th, The chains, g, in combination with the bolts, r, and legs, A, all substantially as and for the purpose shown and described.

10th, The notches in the legs, A, in combination with a corresponding notch on the girders, and the screw, G, all substantially as shown and described and for the purpose specified.

11th, The clamp device consisting of the metallic strap, k, and eccentric roller, v, substantially as shown and described, in combination with the legs, A', and supplementary legs, A'', and strips, p all as and for the purpose set forth.

12th, The tongue and its groove, e', in combination with the girders, D D', substantially as shown and described and for the purpose specified.

79,080.—DEVICE FOR STOPPING AND STARTING CALENDER ROLLS.—Wm. T. Porter, Wilmington, Del.

I claim the rod, F, passing through the roll, A, and connected at one end to the shaft, D of the roller and friction disk, by a swivel joint, its other extremity fitting within the hub block, H, provided with the hand wheel, G, all constructed and arranged to operate substantially as and for the purpose herein set forth.

79,081.—GAS BURNER.—A. C. Rand, New York city.

I claim a gas burner in which a movable check is adjustable towards or away from the stationary check, as herein described for the purpose specified.

79,082.—ORGAN.—Isaac Roush and J. W. Truby, Otto, N. Y.

We claim the grooves, R, in a surface, in combination with a block moving in such grooves, substantially as and for the purpose described.

79,083.—TAILORS' MEASURE.—Wm. Sinnott and John McNaughton, Brooklyn, N. Y.

We claim the adjustable quadrangular frame, composed of the metal bars on each of which a graduated scale is marked, in combination with the vertical bar, d, sliding upon the lower bar, b, of the quadrangular frame, and carrying the adjustable tape measure, C, as herein described for the purpose specified.

79,084.—PORTABLE STOVE.—Jos. Smallwood, St. Johns, N. B.

I claim the furnace or part, A, and the boiler or part, B, when constructed so that they will slide or fold together, as seen in fig. 2, and when used for the purposes set forth, or in combination with a lamp, substantially as described.

79,085.—MEAT CUTTER.—S. L. Stockstill and H. H. Dille, Medway, Ohio.

We claim, 1st, The inclined slotted plate, E, attached to opposite sides of the shell, A, below the spikes, A, whereby, as the two halves of the shell are brought together, the inner edges of the plates fit against each other, to form a partition, as herein described for the purpose specified.

2d, A meat cutter consisting of two rollers, B and C, carrying spikes and cutters respectively, and working within a case, A, that is, by means of a slotted partition, E, divided into two compartments, as set forth.

79,086.—SHUTTER OPERATOR.—Martin Streeter, New Haven, Conn., assignor to himself and Artell Austin, Jersey City, N. J.

I claim securing the blind, C, in any desired position, by means of the screw handle, G, upon the screw shank of the lever, D, acting upon the curved edge of the plate, E, as herein shown and described.

79,087.—SHOE LASTING.—Peter Thompson, Sardis, Ohio.

I claim in combination with the pincers or paris, A A', the jaws, C C, and springs, f f, constructed, arranged, and operating substantially as shown and described.

79,088.—THILL COUPLING.—J. T. Thorp, Southington, Conn.

I claim the hook, F, applied to thill coupling, and passing through a hole in the thill wire, to operate in the manner substantially as and for the purpose set forth.

79,089.—TILE-BENDING MACHINE.—Robert Tyrrell, Sumner, Ill.

I claim the combination of the rotary disk, A, having the two diameters, e f, and provided with the lever, B, and clamping device, g h, with the horizontally and vertically adjustable roller, C, slotted arm, D E, blocks, n o, headed rod, h, provided with the nut, j, and gudgeon, k, all constructed and arranged to operate substantially as herein set forth.

79,090.—INNER SOLES FOR BOOTS AND SHOES.—R. A. Webster, Sandisfield, assignor to himself, John Dowd, and R. J. Dowd, Lee, Mass.

I claim the inner sole, A, constructed substantially as described, for the purposes set forth.

79,091.—PLOW.—J. M. Wilson, Lexington, Miss.

I claim, 1st, A plow consisting of the combination of the arrow, C, with the scraper, D, all made and operating substantially as herein shown and described.

2d, Providing the scraper, D, with notches, a b, to facilitate its fastenings to the standard, A, and arrow, C, substantially as herein shown and described.

79,092.—APPARATUS FOR CONVERTING MOTION.—Kenelm J. Winslow, Montpelier Row, Twickenham Eng.

I claim, 1st, The combination of the loose hollow drums, C, hinged pawls, D, link connections, E E G friction pulley, H, fixed ratchet wheel R, and shaft, A, all constructed and arranged substantially as and for the purpose herein shown and described.

2d, In combination with the above, the retarding rings, K and spring, L, and also the card, O, and pulleys, Q, all constructed and arranged to operate in the manner and for the purpose herein shown and described.

79,093.—THREAD CUTTER.—C. A. Woodbury, Woodstock, Vt.

I claim the thread cutter consisting of the disk, A, having a sharp edge, the notched shield, B, and springs, a, substantially as herein set forth.

79,094.—STEAM GENERATOR.—John Armstrong, New Orleans, La.

I claim the central line or set of vertical tubes, A, in combination with the outer lines or sets of tubes, and with the system of oppositely inclined connecting flues, B, arranged in the manner and for the purpose set forth.

79,095.—WASHING MACHINE.—A. A. Atherton, Waterbury, Vt.

I claim the combination of the board, D, with the knuckles, and the board, E, with rollers containing holes which allow the water to flow freely through them, as and for the purpose specified.

79,096.—WRINGER.—Alfred M. Bailey (assignor to Metropoliton Washing Machine Co.). Middlefield, Conn.

I claim, 1st, In clothes wringers and other machines in which two rolls are required to operate at varying distances from each other, the employment of a spring whose ends extend beyond the bearings of the upper or driven roll, in the manner described, so that the ends of said roll shall bear against the spring, at points intermediate between the bearing points of said spring, as and for the purposes set forth.

2d, In a combination with a spring whose bearing points are located with relation to the points where it is in contact with the upper or driven roll, in the manner specified, the employment of screws or equivalent devices for regulating the pressure of the spring, arranged immediately above the points where the upper roll bears against the said spring as shown and set forth.

3d, The herein described combination and arrangement of the spring with the upper roll, the frame, and the regulating screws so that the said spring may be readily applied to or removed from the machine.

79,097.—CULTIVATING HOPS.—Nelson Baker, Alganzee, Mich.

I claim the herein described method of destroying insects upon hop vines in the open field, by subjecting the vines to the action of pyroligneous, sulphurous, hydrocarbon, or other similar vapors, in the manner specified.

79,098.—MEDICINE FOR HOG CHOLERA.—Joseph P. Ball, Lebanon, Ind.

I claim the improved and newly discovered medicine for the cure and prevention of hog cholera, compounded and prepared of the materials and substances in the manner and proportions, and administered as herein set forth.

79,099.—SAW.—Samuel Barry, Dayton, Ohio.

I claim the mode of attaching the teeth, B and C, to the saw plate, A, substantially as shown and described.

79,100.—IMPLEMENT.—B. F. Bean, Schuykill, Pa.

I claim the combined implement herein described, consisting of the tongs, B C, and screw wrench, C D E, the movable jaw of the latter being made adjustable upon the arm or handle, C by a nut, H, which is fitted to a screw thread cut upon the arm, C, the whole constructed and operating in the manner and for the purpose specified.

79,101.—WASHING MACHINE.—E. E. Brewster, Cleveland, O.

I claim, 1st, The soap drawers, J, in combination with the perforated washboard, B, for the purpose specified.

2d, In combination with the above, the arrangement of the frame, D, brush H, and standards, C, all arranged to operate in the manner as and for the purpose specified.

79,102.—MACHINE FOR CUTTING SOAP.—David S. Brown, Jr., New York city.

I claim, 1st, The combination and arrangement of the bar, B', arms, B B, racks, C, wheels, D, shaft, E, wire frame, H, and bench, A, the whole being made and operated as shown and described.

2d, The arrangement on the frame, I, of the stamping bar, d, stamps, c c c, toggle-jointed bar, e, and lever, h, for the purpose of stamping a number of bars of soap simultaneously the whole being made as shown and described.

3d, The combination and arrangement of the soap cutting and stamping devices herein shown and described.

79,103.—CHURN.—Moses Calvert, Marshall, Ohio.

I claim the construction and combination of the frame, gearing, and dasher, when arranged and operating as herein described and for the purpose set forth.

76,104.—CAR TRUCK FOR CHANGING GAGES.—Henry T. Carter Portland, Me.

I claim, 1st, The four shoulders, d d' d'' and d''', constructed on the bolster, B, substantially as and for the purposes set forth.

2d, The combination of the shoulders, d d' d'' and d''', with the transverse rods, substantially as and for the purposes set forth.

3d, The lateral moving rail, o', with its guard rail h', in combination with the fixed rail and guard rail o and h, substantially as and for the purposes set forth.

4th, The combination of the lateral moving rail, o', and guard rail, h', with their bed or beam and friction rollers or trucks, substantially as and for the purposes set forth.

79,105.—EYELET MACHINE.—George P. Tew, Cranston, administrator of Charles W. Clewley, deceased, assignor to American Eyelet Company, Providence, R. I.

I claim, 1st, The compound instrument, B, composed of a male cutter, c, a die, a, and a female cutter, o, in combination, constituting the moving instruments in the formation of an eyelet, substantially as described.

2d, The combination of the above described compound instrument, B, with the stationary female cutter, d, "former," e, male cutter, b, end collar, f, substantially as described.

3d, The piston, H, in combination with the die, a, arranged and operated substantially as described for the purpose specified.

79,106.—HORSE HAY FORK.—Wm. S. Coffman, Coldwater, Mich.

I claim, in combination with the two parts, A E, of the horse hay fork, hinged together as shown, the spherical rubber spring, G, and bolt, k, upon one part, and the keeper or recess, a, on the upper part, the two acting together, substantially as and for the purpose described.

79,107.—HARNESS SNAP.—Edward A. Cooper Buffalo, N. Y.

I claim the arrangement with the main body of the hook constructed with a flat plate and inwardly projecting lug, g, and an outwardly projecting thumb piece, h, and a flat spring, E, one end of which is secured to the lug, which receives the screw in the main body, and the other end bears against the lug, g, and having an entirely closed chamber for the spring, as herein described.

79,108.—EXTENSION RING FOR BASE OF COOKING STOVES.—David B. Cox Troy, N. Y.

I claim an extension ring, A, applied between the base, B, and body, C, of a stove, substantially as and for the purpose herein specified.

79,109.—FARM GATE.—Jonathan David, East Enterprise, Ind.

I claim, 1st, The arrangement of the forked lever, F, and sheave, c, with the articulation of the said lever on the bar, a, by means of which the front stile, C, is lifted simultaneously with the drawing back of the bolt, G, in the manner and for the purposes substantially as described.

2d, Hoisting the gate by means of the cam, J, and pin, b, through the medium of the slotted supplementary post, B, and guide bolts or screws, n n, or their equivalents, when used substantially in the manner and for the purpose set forth.

3d, The articulated arrangement of the bars, a1 a2 a3, in the stiles, C and C', on the pins, 1 2 3 4 5 6 7 8 9, by means of which the forward end of the gate may be lifted, and kept up by a pin inserted in the hole, 5, over the upper bar D, in the manner as specified.

79,110.—STEAM GENERATOR.—Geo. B. Field, New York city.

I claim, 1st, A steam generator constructed of cast iron or other cast metal, with a hollow cylindrical hub, radiating hollow arms, and a hollow rim connecting the outer ends of said arms substantially as set forth.

2d, Constructing a cast metal steam generator, as above described, with a continuous enlargement of the water space from a point between the arms through the same to the central hub, as described and shown.

3d, The cylinder, C, arranged as shown and described, and for the purpose set forth.

4th, In combination with the section, A, of a steam generator, such as described, a reservoir, E, standing under the main cylinder of said generator and beneath the fire grate, as described.

5th, In connection with the central cylinder, or hub, of a steam generator such as described, and the enclosed cylinder, C, the annular enlargement, N, for the purpose and with the effect set forth.

6th, In combination with a steam generator composed of one or more sections, as herein described, the safety valve, M, having an orifice as large as the interior diameter of the cylindrical hub or largest tube of the generator, as set forth and described.

7th, The arrangement of the feed pipe, B, in connection with the central cylinder or hub of the steam generator described, so that the feed water shall be discharged at the center of the descending current, as set forth and described.

8th, A steam generator composed of sections, A, in the form of hollow rings, with hollow radiating arms connecting said rings with a central cylinder or hub, said sections being placed one above another, and so arranged as to fill the space within the chimney without being embedded in the same, and with the radial arm so disposed as break joint with each other, all as set forth and described.

9th, The tubular rods, J J, arranged to secure the sections, A, to each other, and located outside of said sections, so as to increase the circulation and steam surface, as described.

79,111.—LIFE BOAT.—Lawrence F. Frazee, Jersey City, N. J.

I claim, 1st, The combination of a buoyant and adjustable bow and stern, so arranged that whichever side of the boat floats uppermost, the desired form may be given to the ends thereof.

2d, The adjustable bottom, so arranged that whichever side of the boat is uppermost it may be secured as low as possible, to give room to the feet and legs of the persons carried.

3d, Connecting the adjustable bottom to the adjustable bow and stern, in such a manner that when the latter are secured in the desired position, the former is also fixed as required.

4th, The provision for stowing bread and water in such a manner that

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whichever side of the boat comes uppermost, it is all readily accessible to those on board, all for the purpose and in the manner substantially as described.

79,112.—HARVESTER PITMAN.—George B. Garlinghouse and Cyrus B. Garlinghouse, North Madison, Ind.

We claim in the pitman connection with the cutter of a harvesting machine, the single conical or conoical pivot or point on the pitman entering into a corresponding hole in one side of the knife-heel, in combination with the clamp or its equivalent, arranged to work on the opposite side of the heel, on a center coincident with the point of the pitman, for the purpose of affording free movement in turning on its center, and to take up the slack caused by wear in working the machine.

In combination with the pitman and cutter bar of a harvesting machine, the separate detachable holding device or clamp, D constructed as described for the purpose of keeping the pitman in proper position with the knife heel and to be easily removed.

79,113.—BOX.—W. B. Guernsey, New York city.

I claim the improved box, made of veneer, with its sides fitted and cemented into perpendicular grooves in the heads thereof, as a new article of manufacture.

79,114.—HULL OF STEAMBOAT.—Wm. Hagerty, Monongahela, Pa.

I claim the geometrical system or rule, as illustrated in fig. 1 of the drawings, for drafting the cross timbers, so as to form a segment of a conoid in the hulls of vessels, substantially as set forth and described.

79,115.—DRILL STOCK.—M. Hainque (assignor to himself and John Lowth), San Francisco, Cal.

I claim the combination of the drill stock, A, with the lever, D, the plain or corrugated gib, C, and the sleeve, B, the said parts being constructed and arranged substantially as described.

79,116.—JOINT CLAMP.—D. E. Hall, Detroit, Mich.

I claim the herein-described metallic clamp, when constructed in the manner as and for the purpose set forth.

79,117.—WASHBASIN OVERFLOW AND DISCHARGE PIPE.—B. Havanagh, New York city. Antedated June 13, 1868.

I claim the trap, e, and pipe, f, below the drip pan, d, in combination with the hollow column, g, supporting the basin, and arranged to receive its discharge and overflow, as and for the purposes set forth.

79,118.—SASH BALANCE.—Andrew B. Hester, North Vernon, Ind.

I claim the sash balance consisting of the plate, A, with the pulleys, 1 2 3, as arranged thereon, the pulley, B, the cord, K, the cap, C, and the lever, F, the whole constituted and arranged substantially as described.

79,119.—CULTIVATOR.—J. H. Hill, Clinton, Ill.

I claim, 1st, the frames, A and C, and the lever, F, combined and operating substantially as set forth.

2d, The shovel handles, G, arms, H, and connecting bar, I, arranged substantially as described, in combination with the frame, C, and its adjuncts, substantially as and for the purpose set forth.

79,120.—CORN PLANTER.—J. H. Hill and J. T. Hammond, Clinton, Ill.

We claim the combination and arrangement of the slides, H H, and plates, a a, with the tongue, h chute, F, and plow, E, as set forth.

79,121.—FENCE.—W. D. Hillis, Elgin, Ill.

I claim, 1st, The combination of wire rails, E E1, constructed as above described, with the slotted pickets, F F, and the pins, c' c', substantially as and for the purpose set forth.

2d, The metallic plates, D D, when constructed with the slots and recesses above described, and with the enlarged space, m m, and used in combination with the screw, a, and the wire rails, E E1, substantially as and for the purpose specified.

79,122.—FLOWER FRAME.—C. Hochbrunn, New York city.

I claim the frame for flower ornaments, constructed and arranged as herein shown and described.

79,123.—BOOK BINDING.—Amos Holbrook, Jr., Lynn, Mass.

I claim, 1st, Connecting two or more signatures of a book by a parallel thread passing within the fold of each signature, and through the slit in the end to the next signature, substantially as described and for the purpose set forth.

2d, Combining with the parallel thread, arranged as set forth in the first, claim, series of chain stitches, substantially as described and for the purpose set forth.

79,124.—GLOBE JOINT.—J. F. Hollister, Plano, Ill.

I claim, 1st, The mode of connecting the globe, C, by means of straps on its poles, or their equivalent, substantially as set forth.

2d, The concaves, K K, and vibrating bar, B, combined with the globe, C, and pitman, A, the whole constructed and operating substantially as described.

3d, The lips, L L L L, for the purposes set forth.

4th, The figure, M, in bar, B, for the purpose set forth.

79,125.—DOOR SPRING.—S. W. Huntington, Augusta, Me.

I claim a spring for closing doors, etc., consisting of a strip or cylinder of vulcanized india-rubber, and sockets, m m, in which the ends of the same are held, constructed and arranged as described, and applied to the edge of the door and jamb, to which the door is hinged in the manner set forth.

79,126.—MACHINE FOR MANUFACTURING TELEGRAPHIC CABLE. A. F. Jaloureau, Paris, France.

I claim, 1st, The improved method of forming telegraphic cables by the application of successive layers of bitumen, separated and maintained by spiral bands of bitumenized paper, and consolidated by coils of bituminized twine or yarn, the whole protected, when necessary, by an outer covering of metallic wire, substantially as above specified.

2d, The improved combination of machinery, by aid of which the manufacture of the said cable may be effected with facility, certainty, and economy, substantially as herein set forth and shown in the figures of the accompanying drawings.

79,127.—STOVEPIPE SHELF.—H. C. Johnson (assignor to himself and C. H. Johnson), Delevan, Wis.

1 claim, 1st, A stovepipe shelf, when made in pieces, B and B', with leaves, C and C', secured to a stovepipe, substantially as described.

2d, Loops, D and E, in combination with hooks, F, to secure leaves, C and C', to the center shelf, B and B', constructed as described, one loop being wide and the other narrow, on each piece, B, to provide for the parts, B and B', being adjusted.

3d, Forming hooks, F, straight, on top, and with the semicircle projection on the bottom, as described, for the purpose of easing down the leaf and holding it in place.

79,128.—QUARTER BOOT FOR HORSES.—Wm. H. Jones, Boston, Mass.

I claim the quarter boot, as made with one or more grooves, arranged as described, in its outer surface, and especially about its heel, such being to receive the fastening strap or straps, as set forth.

Also, the arrangement of the fastening strap within a groove going around the heel and through either or both the sides or quarters of the boot, in manner substantially as specified.

Also, the boot, as made with a heel projection, a, and the back rest, k, arranged as specified.

Also, the arrangement of the canvass quarter facings with the shoe and the strap rivets, in manner as described.

79,129.—ELEVATOR.—Gilman Joslin, Boston, Mass.

I claim, 1st, The arrangement of the upper sprocket wheels and independent journals, leaving the space between the two wheels open for the passage of the carriages, substantially as described, and for the purpose set forth.

2d, The guide, S, operating in combination with the carriage, substantially as described and for the purpose set forth.

3d, Beveling the bottom of a chain-elevator carriage and arranging the top of the partition, V, substantially as described and for the purpose set forth.

4th, The narrow trap door, X, arranged and working substantially as described and for the purpose set forth.

5th, The endless chain or band inclosed within guides, substantially as described and for the purpose set forth.

79,130.—GRAIN AND HAY ELEVATOR.—Henry Keck, Canaan, Ohio.

I claim the combination and arrangement of the windlasses, B B, platform, C, pulley and crank, c, block and tackle, E E, rake, F, and double pulley, g, when used in a barn, substantially in the manner and for the purpose as herein shown and set forth.

79,131.—MACHINE FOR GRINDING GLASS PLATE, ETC.—Jonas Kendall, South Framingham, and Addison Hathaway, Lenox, assignors to A. T. Serven, Lenox, Mass.

We claim, in combination with the series of disks or grinders, rotating around a common axis and over a reciprocating table, giving to each disk or grinder a positive rotary motion on its own axis, substantially as described.

Also, in combination with the rotary grinding disks, the mechanism for automatically effecting their downward movement as the grinding progresses, substantially as described.

79,132.—MACHINE FOR POLISHING GLASS.—Jonas Kendall, South Framingham, and Addison Hathaway, Lenox, assignors to A. T. Serven, Lenox, Mass.

We claim the combination of the horizontally reciprocating table, c, the laterally reciprocating carriage, l, the rotary shafts, m, and the polishers, n, when arranged to operate substantially as described.

Also, giving to each polisher a capability of upward yielding movements by means of a spring, z, substantially as set forth.

Also, giving to each polisher a capability of rocking movement, substantially as described.

79,133.—IMPLEMENT FOR SHIELDING PLANTS FROM A HOE.—Alexander Kirkpatrick, Newark, N. J.

I claim the shield, single or double, for protecting plants from injury by the hoe, constructed in the manner and for the purposes specified.

79,134.—LATHE DOG.—R. H. Lecky, Allegheny City, Pa. Antedated June 6, 1868.

I claim the body, A, cam, B, thumb screw, f, and groove, x, constructed, arranged, and operating substantially as herein described and for the purpose set forth.

79,135.—HAY LOADER.—A. W. Lozier, New York city.

I claim 1st, The detachable pin clevises, k k, etc., in combination with the wheel, B, constructed, arranged, and operating substantially as and for the purposes described.

2d, The combination and arrangement of the clevises, the derrick, and the elevating forks, the whole constructed and operating as described and for the purposes set forth.

79,136.—MODE OF SPLICING BELTING.—J. W. Lyder and H. Shreve, Alliance, Ohio.

We claim the four-lipped metallic belt fastener, A, provided with the ridge, c, on its upper or outer side, and with or without the hinge, C, arranged and operating substantially as and for the purposes herein set forth.

79,137.—METALLIC HORSE COLLAR.—C. K. Marshall, New Orleans, La. Antedated June 6, 1868.

I claim, 1st, A metallic horse collar, constructed substantially as described and for the purpose specified.

2d, Bracing the metallic plates of which the horse collar is formed, substantially as described and for the purpose specified.

3d, The combination of the plates, A A, rein eyes, c c, and trace clips, d d, when the same are constructed and arranged substantially as described.

79,138.—HOISTING APPARATUS.—J. E. Marshall and J. W. Schroeder, Baltimore, Md.

We claim, 1st, the revolving cranes, E E, in connection with the rope, a, and spool, C, arranged and operating substantially as and for the purposes above set forth.

2d, The combination of the beveled gear, e, beveled pinions, c c, clutches, g g and b b, spool, C, with brake, h, revolving on the shaft, d, and the rope, a, revolving cranes, E E, braces, F F, and buckets, G G, arranged and operating substantially as and for the purposes above set forth.

79,139.—POCKET KNIFE.—J. E. McBeth, New Orleans, La.

I claim the blade, B, with the upper part, a, only sharpened, flanges, C, and concave, c, arranged and operating substantially as and for the purposes herein set forth.

79,140.—FIRE KINDLER.—Josiah McFerland, Clinton, Ill.

I claim the within described fire kindler or torch, having a hollow bowl A, filled with porous material, and a perforated burner, B, as set forth.

79,141.—FENCE FOR CROSSING STREAMS.—Wm. McFarlin, Jackson, Ill.

I claim the construction and arrangement of the devices described, substantially as and for the purposes set forth.

79,142.—WASH BOILER.—C. E. Miller, Indianapolis, Ind.

I claim a portable wash boiler, having the elevated and perforated bottom, B, from which depend pits, C, having the oblique and perforated directing plates, D, in combination with pipe, E, and adjustable spout or spouts, F, substantially as set forth.

79,143.—PUMP.—Geo. F. Nutting, Randolph, Vt.

I claim the combination of the open-bottomed barrel, A, plunger, B, upper removable part, containing the valve chamber, H, eduction pipe, G, suction pipe, I, and valve, d, all arranged in the manner and for the purpose herein described and represented.

79,144.—SPICE CAN.—C. T. Palmer, Norwich, Conn.

I claim a spice can or powder box as not only made with holes or perforations, a a a, in its cover, but as having a cavity, b, and an annular bead, c, arranged therewith, and with the periphery, d d, of the top of the cover, substantially in manner as explained, and for the purpose of receiving a disk or plate to cover the perforations, the whole being substantially as specified.

79,145.—SCHOOL SEAT AND DESK.—A. E. Roberts, Des Moines, Iowa.

I claim the arrangement of the slate-surfaced folding lid, E, with its notched and grooved slats, I, in combination with the grooved frame, P, its flanges, n, stationary seat, A, and book-holding partition, B, the several parts being constructed and used substantially as and for the purposes set forth.

79,146.—STOCK PUMP.—A. H. Russell, Adrian, Mich.

I claim a stock pump in which are combined and arranged the rod, U, running through the bore of the pump log, A, the hydrostatic bellows, Z, and the pivoted platforms, C B and D, substantially as described.

79,147.—AUTOMATIC SWING.—J. J. Rymal, Rochester, Minn.

I claim, 1st, The projecting flanges, C C, on top of case, A, whereby it can be attached to the ceiling, substantially as and for the purposes herein set forth.

2d, The angle and curve, E, in the bottom of case, A, forming bearings, to hang it on brackets attached to a wall, substantially as and for the purposes herein set forth.

3d, The adjustable legs, D, to set it up or take it down at will, substantially as and for the purposes herein set forth.

4th, The adjustable connecting rod, I, attached to shaft, G, by means of hook, J, and which can be lifted off and on at pleasure, substantially as and for the purposes herein set forth.

5th, The movable arm, d, on the bottom of lever, F, fastened by means of the thumb screw, e, substantially as and for the purposes herein set forth.

6th, The combination of lever, F, arranged on the side of case, A, and cam wheel, B, producing a noiseless vibrating motion, substantially as and for the purposes herein set forth.

79,148.—LEATHER-WORK ORNAMENT.—Lucretia F. Sallee, Peoria, Ill.

I claim the combination of the cement with the leather, untanned hide, gutta percha, and other flexible material, when formed substantially in the manner and for the purposes as herein described.

79,149.—CAR BRAKE.—A. H. Sassaman, Lebanon, Pa.

I claim a brake for railway cars, having lock, F, wedges, V, arms, G and H, levers, K K and L L chains, D E h b o o and Y, and rods, P M and O, constructed, combined, and arranged substantially as specified.

79,150.—PUMP.—A. H. Schofield and DeWitt C. Sterry, Worcester, Mass.

We claim the diaphragm pump having a hollow rod with telescopic connections and operating substantially as described.

79,151.—COMPOUND FOR DESTROYING BED BUGS AND OTHER Vermin.—Peter Seebald, New York city.

I claim, 1st, In preventive for bedbugs a compound which is used as a whitewash for walls, substantially as and for the purpose herein set forth.

2d, The compound, composed of the ingredients herein described, or substantially the same, and for the purpose herein shown.

79,152.—MANUFACTURE OF IRON AND STEEL.—L. Sibert, Mount Solon, Va.

I claim, 1st, The use of manganese, in combination with common salt, substantially in the manner and for the purposes herein set forth.

2d, The use of epsom salts in the treatment of iron in the furnace, for the purpose of purifying the iron.

3d, The method of treatment, herein described, for reducing and purifying the ores and the metal, and for securing uniformity in the quantity of the the metal produced.

79,153.—UNIVERSAL JOINT COUPLING.—Wm. Smead, Rochester, N. Y.

I claim the pivoting points, C cast on the jaws of an ordinary universal joint coupling, in combination with the clamping iron, B, constructed substantialy as herein described and for the purposes set forth.

79,154.—ANIMAL AND BIRD TRAP.—G. C. Stamper, Pella, Iowa.

I claim, 1st, The combination and arrangement of the fixed part, A, and removable half, A', of the case or shell of the trap, with the wheel, B, and platform, C, as and for the purposes set forth.

2d, The box E, when constructed with foraminous top, trap-door bottom, and trap guard, F', and used in connection with the chamber, D, in which the animal is caught, and the box, G, in which he is drowned, in the manner and for the purposes set forth.

3d, The employment of the underground box, G, in connection with the bottomless chamber, D, and for the purposes set forth.

4th, The combination of the platform, C, and bait hook, c', with the lever, N, and beam, O, as and for the purpose set forth.

5th, The combination of the platform, C, and weighted lever, M substantially as and for the purposes set forth.

79,155.—WAGON.—G. C. Stamper, Pella, Iowa.

I claim, 1st, The springs, B, when attached directly to and arranged to act directly upon the wheels of a wagon or other carriage, substantially as and for the purposes specified and set forth.

2d, The anti-friction rollers, s s', when arranged upon the connecting rods, O O, substantially as and to operate as described.

3d, The spring brace, m, as combined with the rear axle and the spring braces n and n', for the front, substantially in the manner illustrated and for the purposes set forth.

79,156.—CHURN.—Andrew Stump, Bodega, Cal., assignor to himself and Charles Colby. Antedated June 6, 1868.

I claim, in combination with the revolving box, A, the interior revolving shaft, F, and arms, c c, together with the clasp, H, and pin, I, the whole constructed and operating substantially as and for the purpose herein described.

79,157.—POSTAGE STAMP.—J. M. Sturgeon, New York city. Antedated June 10, 1858.

I claim, 1st, Attaching stamps to papers or other surfaces by means of an insoluble mucilage or cement, prepared substantially as herein described for the purpose set forth.

2d, Printing upon the face or back of the stamp with the colorless and invisible ink above described, or its equivalent, any canceling mark or device which will become visible on being dampened by water or steam, as and for the purpose set forth.

3d, As an article of manufacture, the insoluble mucilage or cement above described.

4th, As an article of manufacture, a stamp coated with the insoluble mucilage or cement above described.

5th, As an article of manufacture, a stamp having a canceling device printed upon its face or back in the above described colorless ink, or its equivalent, as and for the purpose described.

6th, As a new manufacture, the colored vegetable printing ink prepared substantially as described.

79,158.—PLATFORM FOR ROCK DRILLS.—Peter Sweeney and John Bradburn, New York city.

We claim, in a drill stand, rendered adjustable by means substantially as shown, the adjustable guides, C C, constructed and operating substantially as and for the purpose set forth.

79,159.—HOOK.—Jerome B. Sweetland, Pontiac, Mich.

I claim 1st, The hooks, A, A, when cast with a chamber and with pins, a and b b, substantially as and for the purposes herein set forth.

2d, The triangular plate, B, provided with hook, D, and slots, c c and d, substantially as and for the purposes herein set forth.

3d, The combination of the hooks, A A, triangular slotted plate, B, ring, C, and hook, D, constructed and operating substantially as and for the purposes herein set forth.

79,160.—MANUFACTURE OF FERTILIZERS.—Derk A. Ter Hoeven, Philadelphia, Pa.

I claim the process of making horn-dust as a fertilizer, by the combination of steaming, drying and crushing, as a whole operation, in the manner substantially as described.

79,161.—CULTIVATOR.—Elbert Terril, Cold Water, Mich.

I claim 1st, The arrangement, herein described, for connecting the handles, C C, and cultivator blades, F F, with the beam, A, and stationary cultivator points, E E, so that the whole may be operated substantially as and for the purposes herein set forth.

2d, The round pieces, D D, with their shoulders, c c, and springs, f f, in combination with the handles, C C, for controlling the action of the outside cultivators as herein specified.

79,162.—BOTTLE MOLD.—Lancaster Thomas, Philadelphia, Pa.

I claim the application of a plug or die of any device to bottle molds, when the same is arranged in the manner and for the purpose above set forth and described.

71,163.—RAILWAY SIGNAL.—Samuel C. Thornton, Mooresstown, N. J.

I claim 1st, Frame, composed of, C P P, and P', roller, C R, and curtain, C, bevel-geared wheels, B V B V', arm, A, shaft, S, arm, A', bevel geared wheels, B V" and B V"' arm, A", shaft, S', pinion, P N, arm, A"', racks, R and R', all constructed, arranged, and operating in the manner as above set forth and described.

2d, Racks, R and R', with their arms D and D', said racks arranged with or without bearings, and operating in the manner and for the purpose above set forth.

3d, Bumper, H, with its toggle joint and spring S P, arranged and operating on arms, D and D', in the manner as above set forth and described.

4th, A railway signal composed of the above described parts, all combined, constructed, and operating in the manner as above set forth and shown.

79,164.—MAKING CHEESE-HOOP.—H. M. Viets, Carlisle, Ohio.

I claim the hoop, C, in combination with the hoop, A B, in the manner and for the purpose specified.

79,165.—AXLE FOR VEHICLES.—S. D. Wackman, Auburn, N. Y.

I claim 1st, A trough-shaped axle for vehicles substantially as set forth.

2d, The combination substantially as set forth, with a trough-shaped axle, of tubular bearings.

79,166.—CORN-HUSKER, STRAW AND STALK CUTTER.—R. Warriner and J. H. Baker, Saratoga Springs N. Y.

We claim 1st, The arrangement of the brushes, E E, upon the sides of the leather covered rollers, D D, in the manner and operating as and for the purposes set forth.

2d, The brushes, T T, in the plate, m, on the under side of the lid, S, to operate upon and with the rollers, D D, as specified.

79,167.—LUBRICATOR.—Gardner Watres, Cincinnati, Ohio. Antedated, March 31, 1868.

I claim an automatic lubricator, the glass of which is provided with a soft metal socket or guard cast not only around but also within the lower portion of said bulb or reservoir, so that the metal shall form a button against the enlarged or bulging part of the reservoir, substantially as and for the purposes herein set forth.

79,168.—SHAFT COUPLING.—Seth Wheeler, Albany N. Y.

I claim 1st, A ball and socket, or other analogous closed coupling, having anti-friction pin, stud, or roller applied to it substantially as and for the purpose described.

2d, Constructing the socket, C, with recesses in or through it, adapted for receiving a pin, a, which is applied to an enlargement, D, of a spherical or other shape, substantially as described.

3d, Fitting the driving-pin, a, into a flaring hole, b, made through an enlargement, which works in a socket, C, and covered by means of caps, c c, or their equivalents, substantially as and for the purpose described.

4th, An articulating coupling, with a pin, stud, or roller, which is free to roll on its impinging surfaces, and also to vibrate substantially as described.

5th, The combination of the flaring or oblong pin hole or slot in the ball of the coupling with the oblong slots of the socket, substantially as described.

79,169.—STREET LAMP.—Wm. O. Wheeler Deposit, N. Y.

I claim 1st, A tube of a street lamp of the described construction, when provided with a diaphragm and openings, and having communication effected or cut off by means of an enclosing sleeve, all as described, and for the purpose set forth.

2d, In combination with the above devices, the valves, constructed and operated as described and for the purpose set forth.

3d, A street lamp, so constructed that the gas may be turned on or off by moving the valve which closes the orifices of the lamp, substantially for the purpose set forth.

79,170.—HARVESTER RAKE.—Wm. N. Whiteley, Springfield, Ohio.

I claim a guide-frame B, constructed with an orifice H, over which the switch, D or its equivalent, must move in opening and closing substantially as and for the purpose set forth.

79,171.—HAVRESTER DRIVING WHEEL.—Wm. N. Whiteley, and Thomas Harding, Springfield, Ohio.

We claim the eccentric hollow axle, C, provided with the stud I, or its equivalent and the notched flange, E, in connection with a pin, H, socketed coupling arm, F, and bolt, D, substantially as and for the purpose set forth.

78,172.—STEAM GENERATOR.—Robert Wilde, Philadelphia, Pa.

I claim 1st, In a steam boiler or generator, the perforated dividing partition plates, a" or b", substantially as and for the purpose described.

2d, In combination with a steam boiler or generator, the verticle transverse partition plates, a"' or b"', the same being constructed and arranged substantially as and for the purpose described.

3d, The verticle overflow pipes G G, constructed and arranged substantially as and for the purpose described.

4th, In combination with two or more steam boilers or generators A and B, arranged with one directly above another, and connected together by means of the open verticle overflow pipes, G G as described, the employment of the float, I, in the lower boiler, and the feeding cylinder, C with its case, D, on the upper boiler, the same being connected together by the lever, K, pulleys, H H', and any suitable moving "band" and the whole being arranged to operate together, substantially as and for the purpose described.

79,173.—HORSE HAY FORK.—Henderson Willard, Grand Rapids, Mich.

I claim the arrangement of the horizontal bars, A and C, and tines B B, with the worn screw, D levers, g and h, and cords, f and j, when used as and for the purpose herein fully set forth.

79,174.—RECUMBENT CHAIR.—Torwald Winter, Boston, Mass.

I claim the combination of the base and seat frame, a tipping back, b, jointed arms, c, levers, d, leg rest, i, spring rack bar, n, and its foot piece, q, when all are arranged to operate together, substantially as shown and described.

Also in combination with the above, the foot-piece, k, arranged to swing down against or up from the arms, l, substantially as shown and described.

79,175.—COMBINED SQUARE AND MITER.—W. S. Winterbottom, Philadelphia, Pa.

I claim the angular continuation, b, of the blade of a square, beyond the rear edge of the stock for the purpose specified.

79,176.—MACHINE FOR MAKING WIRE SCREENS, ETC.—Sanford Adams, Boston, Mass.

I claim 1st, The revolving crimper, G, provided with teeth, n n n, either with or without spurs, x x, when arranged and operated substantially as described, and for the purpose set forth.

2d, The jaws, B and C, when arranged to hold the parallel wires into the guides, F F', substantially as described and set forth.

3d, Connecting the guides, F F', together by the connecting pieces, I I, to keep them in position substantially as and for the purpose set forth.

79,177.—MANUFACTURE OF LEATHER.—Wm. Adamson, Philadelphia, Pa.

I claim the treatment of hides or skins with the material and in the manner described for the purpose specified.

79,178.—PREPARATION OF GLUE STOCK.—Wm. Adamson, Philadelphia, Pa.

I claim the treatment of raw hide with the material, and in the manner substantially as described for the purpose specified.

79,179.—MACHINE FOR SHEARING SHEEP.—J. K. Alwood, Delta, Ohio.

I claim 1st, The combination and arrangement of the pendant-wheel F, with the tension rods, H, bars, G, hook bars, N, spring, d, screw, p, and cylindrical boxes, substantially as described for the purpose specified.

2d, The slotted vibrating arm, W, in the shear case S, when operated by the cord, g g' and wheel, Y as herein described for the purpose specified.

3d, The universal swivel joint, E, constructed as described, of the hinged joint ring a, spiral spring, d, encircling the central tube, the bar, n, the slide swivel, c, as herein set forth.

4th, The construction of the swivel holders or guides, D, as herein described for the purpose specified.

5th, The combination of the universal thimble joints, E, tension rods, H, bars, G, pulleys, B F, and shear case, S, substantially as described, for the purpose specified.

6th, The portable sheep shearing device operated by means of the treadle, t, pivoted to the rod, I, of the driving mechanism as herein described, for the purpose specified.

79,180.—SECURING BUCKLES AND RINGS TO HARNESS.—R. B. Anderson, Oneida, Ill.

I claim securing buckles or rings to leather straps by means of a tapering metallic box B, secured by screws, d d, whereby the end of strap is enclosed as specified.

79,181.—INSTRUMENT FOR TESTING SHOE SOLES.—F. T. Andrews, Charlottesville, Va.

I claim the instrument for testing boots and shoes, constructed substantially as herein shown and described, as a new article of manufacture.

79,182.—STEAM SAFETY-VALVE.—E. H. Ashcroft, Lynn, Mass.

I claim 1st, The combination of the diaphragm, C, valve, E, valve, g, stem, d, with the base, b, and spring, i, substantially as herein set forth.

2d, The construction of the valves, g and e, and the arrangement of the recesses, n and m, ledges k l, valve, e, opening, f spring, i, and diaphragm, c substantially as herein set forth.

79,183.—PROPELLER.—Robert Atkin, Brooklyn, N. Y.

I claim the application of the helical propellers, B B, to the sides of a vessel, by the means of a hinged frame, C C, in combination with a suitable mechanism for actuating said propellers, the latter having no connection with the vessel below the water line, and the entire apparatus being made capable of being elevated and turned up against the side of the vessel, and out of water when not required for use, substantially as and for the purpose specified.

79,184.—SWAGE FOR CIRCULAR SAWS.—John G. Baker (assignor to Henry Disston), Philadelphia, Pa,

I claim, 1st, A bar, A, adapted at its lower end to or arranged to embrace the collar, washer, or spindle of a circular saw, in combination with the swage, D, hung loosely to the said bar, but having its movement on the same limited, all substantially as and for the purpose herein set forth.

2d, In combination with the said bar, a plate, n, for fitting against the face of the saw blade, as described.

79,185.—SAW.—John Gulick Baker (assignor to himself and Henry Disston), Philadelphia, Pa.

I claim a hard metal block, adapted to an opening formed in the blade of a saw, and having projections which fit notches in the detachable tooth, in combination with a soft metal packing, fitting the said opening at one side of the block, and maintaining the latter in its place, all being constructed and operating in the manner substantially as described.

79,186.—CARRIAGE BRAKE.—William Ballard, Lapeer, N. Y.

I claim, 1st, The bent hound-bolt or crank, as described, and fastened to hounds and tongues by means of iron straps, j j and o, also the said manner of fastening, as herein described, and for the purposes set forth.

2d, The rod, f, connected with slides, k k (slots or slides), and with rod, l, and brake, m, in four parts, m, t, p, and r, with slides, slots, and spiral coil springs, in combination with crank-hound bolt, g, and other parts herein mentioned and claimed, substantially in the manner and for the purposes herein described and set forth.

79,187.—LAMP EXTINGUISHER.—Stephen J. Batchelder Manchester, N. H.

I claim the flanged cap or extinguisher, A, so constructed as to cover the wick and vapor tubes, F and G, in combination with the flat spring or band,

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C, embracing the wick tube, F, and operating in connection with the spindle crank, B.

79,188.—MANGLE.—Joseph Beaumont, Chambersburg, Pa.

I claim the rollers, a c c', in combination with the enveloping cloth, e, table, A, adjustable brackets, d d', and springs, c'' c''', as and for the purpose described.

79,189.—SEEDING MACHINE.—Sanford Beckwith, Oshkosh, Wis.

I claim, 1st, The screw cylinder, d, cup, m, and adjustable cap, e, arranged relatively one to the other for joint action, substantially as and for the purpose set forth.

2d, The screw cylinder, d, in combination with cup, m, as herein described for the purposes set forth.

3d, The semi-elliptical tube or scatterer, k l, as and for the purposes set forth.

4th, The slots, n n, as a means of adjusting the part, l, relative to the part, k, as and for the purposes set forth.

79,190.—BASIN FAUCET.—John Benson, Yonkers, N, Y.

I claim, 1st, The combination of the coupling tube, A, having nuts, b, above and below the slab, with the stock, C, of the cock, and locking nut, D, all arranged and operating substantially as shown and described.

2d, In combination with the above, the cap or shell, E, attached to the stock, C, and enclosing the coupling joints, substantially as shown and described.

79,191.—SHEARS.—Georg Bergner, Washington, Mo.

I claim the slotted bolt, b, with its cap, e, spring, o, shoulder, n, all in combination, when arranged in relation to each other and the blades of the shears, substantially as and for the purpose specified.

79,192.—BRICK DRYING KILN.—E. W. Bingham, Williamsport, Pa.

I claim the combination and arrangement of the drying kiln, A, with its apartments, arched entrances, a a, gates, b b, side flues, d d, and the valves, e e, and the furnaces, B B, with flues, C C, and valves, c c, substantially as and for the purposes herein set forth.

79,193.—SHEARS.—Charles Bishop, Trumbull, Conn.

I claim shears, the joint of which is constructed in the manner described, that is to say, the one blade constructed with a circular flange, d, the internal diameter of which is less than the rivet or screw, the other blade with a recess corresponding to the said flange, d, and so that a portion of the recessed blade will enter, fill, and fit the space within the circular flange on the other blade, and through the center of which a screw or rivet, i, is placed, to secure the two blades together, substantially in the manner and for the purpose set forth.

79,194.—CARD OR TICKET CASE.—Charles C. Blakemore, Washington Court House, assignor to George C. Robinson and Henry A. Manning, Cincinnati, Ohio.

I claim the case, A, hinged open face cover, C, rectangular spring, D, and elastic lips, B, combined, arranged, and operating in the manner and for the purpose specified.

79,195.—GRATE.—Edmond Bosdevex, Philadelphia, Pa.

I claim the combination of a permanent grate, B, and a grate, D, hung to the rear side of a fire place, and capable of such adjustment that its front edge may be brought to any desired position on the grate, B, for the purpose described.

79,196.—PAINT COMPOUND.—H. W. Bradley, Binghampton, N. Y.

I claim a paint, produced by combining the oxide of lead or zinc, or other pigment or pigments, with the materials hereinbefore named, mixed and treated in or about the proportions and substantially in the manner described, for the purpose specified.

79,197.—CHURN.—Joseph W. Bradley and George H. Jordan, Rochester, Mo.

We claim, 1st, The perforated agitator, D, when provided with knives, x, and operated as and for the purpose specified.

2d, The strainer, E, when used in combination with a churn, and constructed as and for the purpose herein set forth.

79,198.—EXPANDING MANDREL.—John Brewer, Philadelphia, Pa.

I claim the cutter head, E, in combination with the screw rod, D, cap, C, swivel, B, slotted stock, A, and the rod, G, as shown.

79,199.—SEWER.—Jesse Brown, San Francisco, Cal.

I claim the protective cap, when constructed and arranged as described, so as to secure the upper and lower drains of privies, as set forth.

79,200.—HYDRANT.—Thomas Brown, Allegheny City, Pa.

I claim, 1st, The spout, D, and pipe, E, with the inclined slot, B, and movable cap, C, combined, arranged, and operating substantially as described.

2d, the hollow valve, H, and hollowed screwed stem, G, with the nut, L, pipe, E, and spout, D, combined, arranged, and operating as and for the purpose set forth.

79,201.—GATE.—John A. Burchard and Richard Tattershall, Beloit, Wis. Antedated February 12, 1868.

We claim, 1st, Broadly the employment of the double pulley, D d, pawl, E, ratchet, e, weight, G, and cords, h h, when constructed, arranged, and operated for the purpose of operating a gate or gates.

2d, Broadly the circular inclined plane, J, when constructed and arranged substantially as herein set forth and described, for the purpose specified.

3d, The latches, n n, and stops, p p, in combination with the inclined planes J J, shaft, C C, cranks, c c, pulley, D d, cords, h h, weight, G, gate standards, B B, rods, b'b', and rollers, I I, when the whole is constructed and arranged to operate substantially as herein described.

79,202.—KNITTING MACHINE.—W. W. Burson and John Nelson, Rockford, Ill. Antedated June 12, 1868.

We claim, 1st, The combination and arrangement, with the supporting frames, A D, of the gate, E, vibrating yarn carrier, H, and plates, B B, provided with loop carriers, e e e e, and feed rack, N, the whole operating as and for the purpose set forth.

2d, The two parallel plates, B B, carrying the loop carriers, e e e e, constructed and arranged to move in the groove, C, substantially as described.

3d, The combination of yarn carrier, H, with looper bearer, K, groove, n, and pin, m, constructed and operating substantially as set forth.

4 h, The combination of yarn carrier, H, constructed in two parts as described, with releasing lever, P, loopers, a a', and loop hooks, e e, arranged to knit irregular work, as set forth.

5th, The reversing crank, L, in combination with the looper bearer, K, operating substantially as described.

6th, The combination of the stop blocks, t t', reversing rods, o o, and loop hooks, e e e, when constructed and operating substantially as specified.

7th, The combination and arrangement of reversing rods, o o, cams, s s', and trip plate, T, when constructed and operating substantially as described.

8th, The combination and arrangement of the feed lever, M, toothed rack, N, and cam opening, V, constructed and operating substantially as described.

9th, The combination and arrangement of spring, Y, feed bar, M, and crank L, operating substantially as set forth.

10th, The combination and arrangement of releasing lever, P, looper bearer, K, and crank, L, when constructed and operating substantially as described.

11th, Constructing and arranging a knitting mechanism, substantially such as herein described, so that the reciprocating motion of the gate, E, shall impart the proper motions to the different parts, substantially as set forth.

79,203.—EDGE PLANE FOR BOOTS, ETC.—F. Buxton and Geo. Crosby, Lake Village, N. H.

We claim the adjustable guard plate, E, constructed substantially in the manner and for the purpose described and set forth.

Also, constructing edge planes with a bolster or part, L, substantially as described and for the purpose set forth.

79,204.—OPERATING SLIDE VALVES.—Isaac Church, Jr., Norwalk, Conn.

I claim the arrangement of the puppet valves, I I', with relation to main valve, D, steam passage, H, and piston, B, in such manner as to dispense with all outer connection therewith, substantially as shown and described.

79,205.—WHIFFLE TREE PLATE.—James B. Clark, Plantsville, Conn.

I claim a whiffle tree plate, with its shaft, B, tenon, C, bearings, E and F, and third plate, G, all constructed and operating substantially as described.

79,206.—CAR BRAKE.—Lyman Clark, Pine Island, Minn.

I claim the friction wheels or rollers, C, and shaft, F, combined with the wheels of a railroad car, and with the brakes controlling the same, when operated by a chain or cord winding upon a horizontal rod or shaft beneath the car, substantially in the manner and for the purpose herein set forth.

79,207.—THREAD GUIDING PLATE FOR FILLING TATTING SHUTTLES.—Abram Clow, Port Byron, N. Y.

I claim, as an article of manufacture, the guide plate, A, constructed and slotted as herein shown and described, and for the purpose set forth.

79,208.—TOY HEAD FOR CANES.—Augustus Cooke, Orange, N. J.

I claim, 1st, Forming the top of a cane in the shape of an animal or bird's head, the features of which can be moved by pressing upon knobs in the cane.

2d, The combination of the wires, b g and d, with the eyeball plate, a', tongue, e, lower jaw, f, and springs, a', f', and c', when arranged and operating substantially as described.

79,209.—INSTRUMENT FOR ADDING FIGURES.—Charles Corliss, Haverhill, Mass.

I claim, 1st, Operating the indicator that designates the figure or number to be added, by means of a sliding rod or bar, in such a manner that the said indicator will return to its original position upon each retraction of the rod or bar to its projected position.

2d, The simultaneous resetting of the several indicators, substantially as specified.

79,210.—CLASP FOR HOOP SKIRTS.—Abel J. Cross, Greenport, N. Y.

I claim a clasp for uniting the tapes to the hoops in skeleton skirts, the same being formed of a series of alternate diagonal metallic bars, extending from the penetrating points on one side to the penetrating points on the other side of the clasp, as specified.

79,211.—FLOUR PACKER.—Christian Custer (assignor to himself and Charles K. Bullock), Philadelphia, Pa.

I claim, 1st, The combination in a flour packing machine of a stationary cylinder, G, with a sliding cylinder, H, within which operate the devices for propelling and packing the flour.

2d, The within described propelling device consisting of two propellers, f and f, attached to a shaft, I, one on each side of a cross bar, e', having inclined arms, the whole being combined with the sliding cylinder, H, substantially as specified.

3d, The sliding cylinder, H, and strap bar, N, so connected that the said bar will be operated by the movement of the cylinder, substantially as described.

79,212.—STOVE DRUM.—D. W. Cutting, Cambridge, Vt.

I claim the arrangement of the drum, C, over the fire box of a cooking or box stove, when said drum is provided with an opening near each side, from which project two pipes, B B, that lie parallel to each other in the stove, and are provided with elbows that pass through openings in the side of the stove, opposite to each other, for receiving and transmitting air, as and for the purpose set forth.

79,213.—DEVICE FOR HOLDING ROTARY CUTTERS WHILE BEING GROUND.—Henry Disston, Philadelphia, Pa.

I claim the frame, A, arranged for the reception of the spindle of a rotary cutter, as set forth, in combination of the rear rollers, f, and the vertically adjustable roller, c, substantially as and for the purpose specified.

79,214.—MAIL BAG.—D. Frank Dodge, Lowville, N. Y.

I claim the construction of the mouth frame, A B, as herein constructed and set forth.

79,215.—STEAM GENERATOR.—Edward Dunscomb, Boston, Mass. Antedated May 7, 1868.

I claim a steam generator constructed and arranged as shown and described.

79,216.—CORK SCREW.—John E. Earle, New Haven, Conn.

I claim the combination of the handles, B and D, with the cork screw, E, pivoted together so as to operate in the manner shown and described, and with or without the cutters, A and C.

79,217.—PUMP.—Chas. F. Eastleck, Mantua, N. J.

I claim the pump having cylinder, A, plunger, B, piston, C, pipe, D, platform, E, lever, G, trough, K, constructed, combined, and arranged substantially as and for the purposes specified.

79,218.—SMUT MILL.—John T. Ewan and James R. Glenn, Hillsboro, Ill.

We claim the arrangement upon the frame, A, in the manner described, of the suction legs, K K, chambers, M M, check boards, L L, air trunk, D, and its valves, R R, dust chamber, O, and spouts, S S, with the cylinder, F, its wire brushes, J, staves, I, plates, G H, fan, P, and shaft, C, with their various parts, all constructed and operating substantially as and for the purposes set forth.

79,219.—SUPPLEMENTAL JAW FOR WRENCHES.—Robt. Faries, Indianapolis, Ind.

I claim the applicable wrench jaw, when made substantially as described, as an article of manufacture.

79,220.—LINING FLEXIBLE AND OTHER HOSE AND TUBES WITH INDIA RUBBER, ETC.—James B. Forsyth, Boston, Mass., assignor to himself and John H. Cheever, New York.

I claim, 1st, Water-proof hose or tubing composed of a tube of woven fabric or other material, and a vulcanized india-rubber lining, the two being held and cemented together by interposed non-vulcanizable gum, as and for the purposes herein set forth.

2d, The method of lining hose, or other tubular articles, by inserting in the article to be lined the vulcanized rubber, or equivalent lining, with its coating or exterior layer of unvulcanizable gum, and then expanding said lining, and forcing the said gum or cementing material into the meshes or pores of the article to be lined, by means of steam, hot water, or hot air introduced within the lining, as set forth.

3d, A lining for hose and other tubular articles, composed of a tube of vulcanized rubber, with an exterior coating or layer of unvulcanizable gum or cement, with or without one or more plies of cloth or other fabric, combined and united with the lining as herein set forth.

4th, The method herein described of coating the hose or tubing with vulcanized rubber, both internally and externally, as and for the purposes set forth.

79,221.—LAMP BURNER.—Edward A. Galbraith (assignor to himself and Paul P. Todd), Boston, Mass.

I claim, 1st, The combination with the conduit for supplying air to the flame, of a vapor conducting pipe, leading from the fluid reservoir of the lamp and communicating with the said air conduit, substantially as and for the purposes herein shown and set forth.

2d, A lamp burner in which the divided wick tube with its double wick, the air supplying pipe or conduit, and the vapor conduit are combined and arranged for joint operation in the manner herein shown and described.

79,222.—LETTER BOX.—Chas. P. Gorely, Boston, Mass.

I claim, 1st, The combination and arrangement of the, B, bars, D E F, wire or chain, G, and spring, S, all constructed and operating substantially in the manner and for the purpose specified.

2d, The introduction of the chains, H and G, into the length of the bell wires, for the purpose of allowing either of two modes specified to be used in ringing the bell, without interfering with the other, as set forth.

79,223.—HAMES FASTENER.—Jacob Harding (assignor to Henry I. Allen & Co.), Schoolcraft, Mich.

I claim, 1st, The straps, A and B, connected by the lever, C, as and for the purposes set forth.

2d, The projecting feather, E, and groove, 3, when operated in connection with lever arm, C, and strap, B, substantially as described and for the purposes specified.

79,224.—HAMES COUPLING.—Geo. W. Heckart (assignor to himself and Christian Kramer), Columbiana, Ohio.

I claim a hames coupling constructed, arranged, and operating substantially as herein described and for the purpose set forth.

79,225.—STEAM GENERATOR.—H. Heine, New York city.

I claim, 1st, A steam generator composed of an internal main or central part, M, and of an outer annular water space, G, said internal part being provided with a water space, D, and fire flues, a, and communicating with the outer annular water space or pipes, e and q, all as shown and described.

2d, The steam dome, E, rising through the center of the bonnet, I, which covers up the annular water space, G, said water space steam dome being connected by pipes, q, substantially as and for the purposes set forth.

3d, The water pipes, H, situated in the combustion chamber, F, between the central part and the annular water space, substantially as and for the purpose set forth.

4th, The siphons, b, connecting the pipes, H, and the water legs, C, substantially as and for the purpose described.

79,226.—HOT AIR REGISTER.—Wm. Highton, Malden, assignor to Moses Pond & Co., Boston, Mass.

I claim the arrangement and combination of the wheel with the grate, the sliders, and the series of shutters applied to the frame, A, as set forth.

Also the combination of the frame, A, and the ribs, F, with their recesses, r r, as and for the purpose specified.

79,227.—FASTENING CHECK HOOKS AND TERRETS.—A. L. Hill, Decatur, Ill.

I claim providing the terrets, B B, and check hook, A, with loops, h h, as and for the purpose specified.

79,228.—HORSE HAY FORK.—Alfred Houghton, Seville, Ohio.

I claim the checks, E F, springs, G, in combination with the slide, C, in the manner as and for the purpose specified.

79,229.—MANUFACTURE OF GUNPOWDER.—Wm. H. Jackson, Salem, Mass.

I claim the manufacture of gunpowder by mixing a solution of nitrate of potash, or a known equivalent thereof, with a soluble vegetable extract, such as extract of logwood, or with other soluble organic matter, and by subsequently evaporating to dryness, with or without the addition of sulphur or of pulverized charcoal, substantially as herein above described.

79,230.—GAS HEATER.—William Jones, Chelsea, Mass.

I claim, for the purpose of mixing air and gas to be burned, a plug cock, having a long, open, chambered plug, with inlets, k k, and outlet, j, arranged to operate substantially as described.

Also, in connection with a burner arranged within a confined space, provision substantially as shown and described, for supplying fresh, unvitiated atmospheric air, to be mingled with the gas passing to the flame, as set forth.

79,231.—PESSARY.—Benjamin Joseph (assignor to himself and Wm. McNiece), Philadelphia, Pa.

I claim, 1st, The hollow vertical shaft, c, in combination with the body, A, as and for the above described purpose.

2d, The combination of the base, B, shaft, c, and universal joint, d, as and for the above described purpose.

79,232.—TICKET PUNCH.—R. J. Kellett, San Francisco, Cal.

I claim a small auxiliary punch so arranged as to punch a hole in the coupon or portion so removed, at the same operation which removes or punches the coupon or portion of the ticket, thus providing a convenient means for stringing said coupons or portions for preservation and reference, as described.

79,233.—BILLIARD REGISTER.—Isaac Kling, Seymour, Ind.

I claim, 1st, Operating the index rod, which shows the number of games played, by the movement of the points to mark the games, as set forth.

2d, The combination of the slotted slides, B and C, doors, I I, index rod, D, and spring, c, with the bar, E, and wire, E1, when arranged and operating substantially as described.

3d, The pivoted plates, d2, and spring, d3, in combination with the notches, H, for preventing the index rod from being raised from the outside of the case.

4th, The spring, b2, and inclined plane, B3, for operating the connection and disconnection of the slider and bar, E, as set forth.

5th, The checking points, e2, provided with springs, e4, and latches, e3, in combination with the notch, e6, and depression, f3, for preventing the points from being moved backward and re-marked without counting a game, as set forth.

79,234.—ZINCING IRON.—Fred'k A. Kraft, Philadelphia, Pa.

I claim a zincing bath composed of an outer casing of iron, containing an inner lining or casing of copper, or its equivalent, as set forth.

79,235.—SHIPS' FENDER.—Ezra B. Lake, Bridgeport, N. J.

I claim the within described fender, composed of a strip of wood and of uertical and transeverse rollers, the whole being constructed and arranged substantially as and for the purpose herein set forth.

79,236.—COMBINED CULTIVATOR AND PLANTER.—Charles L. Lee, Fitchville, Ohio.

I claim, 1st, The adjustable frame, A, platform, K, lever, B', axletree, B, and wheels, D, all constructed and arranged to operate in the manner substantially as set forth.

2d, The slide boxes, J, groove, a, slide, G, and lever, H, as constructed and arranged to operate in the manner and for the purpose specified.

79,237.—MANUFACTURING BOLSTER PLATES.—Wm. J. Lewis and Henry W. Oliver, Jr., Pittsburg, Pa.

We claim a new article of manufacture, viz., iron bars rolled to the shape of a connected series of blanks for bolster plates, substantially as herein described and for the purpose set forth.

79,238.—AXLE BOX.—I. Stone Lister, Philadelphia, Pa.

I claim, 1st, A bearing arranged within an axle box above a journal, and having a chamber and channels leading from the same, through which oil may flow by its own gravity to the journal, all substantially as and for the purpose described.

2d, The combination of the said chambered bearing with the oil reservoi, G.

3d, The plug, I, with its air passages, p and p', and regulating valve, q, in combination with the reservoir, G.

79,239.—BELT COUPLING.—T. S. Livermore, Leicester, Mass.

I claim the above described coupling, consisting of the screw, with its conical head, in combination with a nut of similar form, capable of being drawn into the belt, when constructed and operating in the manner and for the purposes above set forth and described.

79,240.—WATER-PROOF LEATHER CEMENT.—Wm. S. Loughbrough, Rochester, N. Y.

I claim the compound composed of the ingredients above set forth.

79,241.—FEVER AND AGUE MEDICINE.—John Mabrey, Jefferson City, Mo.

I claim a remedy for the fever and ague and other bilious diseases, compounded of the ingredients, in the proportions, and in the manner herein specified, substantially as described.

79,242.—CARPET STRETCHER AND TACK HOLDER.—R. M. Mansur, Augusta, Me.

I claim the construction of the three pronged plate, with the elastic rubber rings, F F, as a tool for the purposes set forth and herein described.

79,243.—BEEHIVE.—Jacob McDonald, Buffalo, Ohio.

I claim the guiding board, A, with side strips, g g, the two sections, C C, and cross board, i, for the use and purpose as specified and herein set forth.

79,244.—CHURN.—James H. Monce, Hopkinsville, Ohio.

I claim, 1st, The arrangement and combination of the adjustable arm, K, pitman, L, and reversible balance wheel, M, as herein described and for the purposes set forth.

2d, The combination of the pitman, L, and reversible wheel, M, when constructed and operating as herein described, for the purposes set forth.

79,245.—CAR COUPLING.—Benjamin Monroe (assignor to himself, Wm. E. Chadwick, and Nathan N. Cole), Bristol, R. I.

I claim, 1st, The combination of the draw pin, B, constructed as described, with the slotted draw head, H, having an inclined or funnel-shaped orifice, as described.

2d, The combination of the head, H, pin, B, and link, L, all constructed and operating as and for the purpose specified.

79,246.—SHEARS SHARPENER.—Melvin M. Morse and M. V. Collins, Buffalo, N. Y.

We claim, 1st, The adjustable gage plate, D, provided with stops, e e, arranged and operating with the grinding wheel, B, substantially as set forth.

2d, In combination therewith, the self-adjusting pressure roller, F, substantially in the manner and for the purpose set forth.

3d, The spring, h, arranged with a pressure roller, F, and gage stops, e, substantially as and for the purpose specified.

79,247.—BRICK DRYER.—John M. Moyer, Pittsburg, Pa. Antedated Dec. 23, 1867.

I claim the turn table, with car tracks, with heater beneath, in combination with the grooved pulley wheels, arranged and operating substantially as and for the purpose herein described.

The car, with upright center plate, and hinged folding leaves, constructed and operating in manner and form as described, to and for the purpose intended.

79,248.—SASH FASTENER.—Henry North, New Britain, Conn.

I claim, 1st, The combination of the bolt, D, pivoted at f, with the shoulder k, and the leaf or bit, i, for the purpose of locking the sash down when the lock is placed in the casing, or locking the sash up when the lock is placed in the sash, substantially as herein described.

2d, The spring, G, operating in combination with the bolt, D, to press the sash laterally against the casing and prevent rattling when the bolt is locked into the recess, L, substantially as described.

3d, So constructing and arranging the several parts of the lock described, that the bolt, D, which locks into the recess, L, to secure the sash in the manner described when closed, shall turn upward when the sash is opened, and act as a pawl or stop, under the influence the spring, E, to hold the sash in any desired position, and which can be raised to release the sash by the same leaf or bit, i, which locks it down, substantially as herein specified.

79,249.—MORTISING MACHINE.—Gerrit V. Orton and John Richards, Cincinnati, Ohio.

We claim, 1st, The tractional device, p and q, for controlling the action of the treadle and chisel bar, substantially as herein described.

2d, Adjusting the table support, a', laterally upon the stud, b', in the manner and for the purposes shown.

6d, The bent stops, n' n', when arranged to swing and adjust to different points on the stuff, in the manner herein set forth and shown.

4th, The adjustable nut piece, h', arranged with a clamping screw, to act on stuff of different thickness, in the manner and for the object as specified.

5th, The rotating clamp piece, i, for adjusting and holding the table support, a, in different positions, as shown and for the objects described.

79,250.—CHEESE CURD RAKE.—Edwin A. Palmer, Clayville, N. Y. Antedated June 12, 1868.

I claim the upper head, C, and the braces, D D, or their equivalent, for the purpose therein described and set forth.

79,251.—WAGON BOX.—Hiram Palker, Salem, assignor to H. W. Persing, Marion county, Ill.

I claim the combination and arrangement of the eccentric, a, working on the studs, f, the rods, b b, working in the staples, d d, the pawl, y, attached to the handle of the eccentric, a, so as to work in the ratchet, g, substantially in the manner shown and described, and for the purposes above set forth.

79,252.—RAILWAY TRUCK.—Wm. P. Parrott (assignor to N. F. Bryant), Boston, Mass.

I claim the combination and arrangement of a car truck with laterally moving wheels, as described.

79,253.—ANDIRON AND FIREPLACE.—Frederic Passy, Paris, France.

I claim, 1st, An andiron having channels or passages arranged substantially as described, so that a current of air from the lower portion of the apartment in which the andiron is placed shall pass into and through the andiron, and be discharged into the apartment in a heated state, as specified.

3d, The combination of the above and a water receptacle, arranged upon the upper end of the andiron, as and for the purpose described.

79,254.—CAR COUPLING.—Abram Perrin, Cleveland, Ohio, assignor to himself, Chas. L. Rowand, Geo. S. Selden, and Marmaduke Moore, Philadelphia, Pa.

I claim the construction of the draw head, A, with its open side, and pin, h, and having stops, c1 c2 and c3, of the form shown, in combination with the link or connecting irons, D and H, the former being provided with a heat, d1, and lug, 2, and weight, G, all substantially as and for the purpose set forth.

79,255.—MACHINE FOR FORGING NUTS.—Amzi P. Plant and Amos Shepard, Plantsville, Conn.

We claim, 1st, The right and left hand conveyor, u, when so constructed as to convey a nut blank from the cut-off mechanism, whether moving from the right or left, and slotted plate, A, in combination with the cut-off device and a forging mechanism on the right and left of it, substantially as described.

2d, The swinging conveyors, u1 u2 u3, in combination with the forging, punching, and finishing mechanism, all constructed, arranged, and operating substantially as described.

79,256.—SAP SPILE.—Charles C. Post, Hinesburg, Vt.

I claim the sap spile constructed with the longitudinal fins, B, whereby it may be held or retained in the tap or hole in the tree without materially interfering with the flow of the sap, substantially as herein set forth.

79,257.—CHERRY STONER.—Albert Rakestraw, Peoria, Ill.

I claim a cherry stoner having sliding beam, D, openings, B C E H and K, fork, O, and block, Q, constructed, arranged, and operating substantially as herein specified.

79,258.—TUBULAR AXLE.—T. C. Rice, Worcester, Mass. Antedated June 9, 1868,

I claim the square-shouldered offsets, C C, on the axle, A, for securing it to the wooden bed, B, with the clips, a a, which fit over such shoulder, as herein shown and described.

79,259.—COAT RACK.—Jesse B. Rumsey, Sturgis, Mich.

I claim, 1st, The form or construction of the butterfly-wing frames, A A, with their series of overhanging coat hooks, a a a a, as arranged and combined with the socket chairs, B B', substantially as described, for the purpose specified.

2d, The combination of the connecting bar, D, and the chairs, B B', with one or more hinged frames, having each a series of overhanging coat or clothes hooks, to be placed and secured in any desired position, substantially as and for the purposes herein set forth.

79,260.—APPARATUS FOR DISTILLING.—D. Saville, Paris, France.

I claim, 1st, The combination, with the column, B, of a casing, A, divided into two compartments, A' B', the lower containing a heating pipe, m, and the upper a perforated pipe, a, or its equivalent, substantially as and for the purpose described.

2d, Graduating the size of the openings in the perforated plates of the column, and the length of the tubes which extend above said plates, substantially as and for the purpose specified.

3d, The casing, O, communicating with the heater, A, or with its column, in combination with the casing, O', its tube, s, and float, o, connected to the throttle valve, m2, the whole being arranged and operating substantially as and for the purpose described.

4th, The arrangement, in respect to the heater, A, and column, B, of a cooler, F, consisting of a casing divided by partitions and pipes into two compartments, one communicating with the column, and the other with the water pipes, c1, as set forth.

79,261.—SOLIDIFIED COLLODION.—Chas. A. Seely, New York city.

I claim the compound of collodion and nitro-glucose, prepared and compounded substantially as described.

79,262.—SAD IRON.—Joseph Shalkenback, Chicago, Ill.

I claim the revolving sad iron, A, constructed with flat and curved faces, as described, and adjusted in its handle, F, by means of the spring latch, G, and the disk, S, in which are the notches, K, arranged to correspond with the desired position of the sad iron, substantially as set forth.

79,263.—STEERING APPARATUS.—Henry F. Shaw, West Roxbury, assignor to J. A. Woodbury and S. S. Gray, Boston, Mass.

I claim the combination, with the rudder post, C, of the sleeve, G, provided with the eccentric, g, and the gears, D and E, substantially as and for the purpose specified.

The combination of a spring with the arm of the oscillating gear, E, substantially as and for the purpose specified.

79,264.—PULLEY BLOCK.—Henry F. Shaw, West Roxbury, assignor to James A. Woodbury and Solomon S. Gray, Boston, Mass.

I claim the combination, in a pulley block, of the winding wheel, D, the differential gear, pulleys, E F, and an eccentric sleeve, substantially as and for the purpose set forth.

79,265.—TYPE WRITING MACHINE.—C. Latham Sholes, Carlos Glidden, and Samuel W. Soule, Milwaukee, Wis.

We claim, 1st, The key levers, D, vibrating on the fulcrum, M, with the inner ends or fingers, u, reaching under the type bars, so that the keys will act directly on the types, substantially as and for the purpose described.

2d, The spacer or ratchet, I, combined with the bifurcated lever, H, connected with the bar, T, pivoted at, s, and resting on and across the arms of the keys, L, behind the fulcrum, m, so that striking the faces of the keys will work the teeth of the forks of the lever up and down and into the notches of the spacer, and give a certain uniform and regular space movement to the paper carriage, in line of the types, when made substantially as described.

3d, The pins, e, fastened to the table, A1, combined with the pawl, k, and the spring, l', to give the paper carriage a certain and regular cross-line movement, at a right angle to the space movement, from line to line, when made substantially as described.

4th, The clasps or springs, b, attached to the bars, C and C', on [illegible] through the middle of the platten, G, combined with the springs, a, attached

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to the bar, E, to hold the paper to the carriage, and press it down smooth and tight, in passing under the platen, when made substantially as described.

5th, The spools, m, combined with the gudgeons, s', the shaft, b, the pulleys, k and R, the band, v', the cord, v, the weight, W, the ratchet wheel, V, the pawl, t, and the bar, P, pivoted to the back of the case, A2, to feed a fresh part of the inking-ribbon under the platen, to each type successively, when made substantially as described.

79,266.—SPIRIT LEVEL.—J. D. Sibley, Middletown, Conn.

I claim the combination of the revolving sighted level with the disk, A, when arranged and operating as herein described, and for the purposes set forth.

79,267.—CAR TRACK.—Sidney Skillman, Jersey city; N. J.—Antedated June 16, 1868.

I claim, 1st, The swiveling of the truck on a centre coincident with the centre of the boiler, by means of the swiveling ring, H, arranged substantially as herein described.

2d, In connection with the above, the tilting ring, G, turning on the centres, g1 g2 and h1 h2, arranged substantially and for the purpose herein specified.

3d, In combination with the boiler, D, located at or forward of the centre of the truck, the employment of a bearing, I, in rear of the centre of the centre of the truck, so arranged as to support or aid in supporting the weight of the car in such manner as to throw more of its weight upon the rear than upon the front axle of the truck, substantially as and for the purposes herein set forth.

4th, The within-described arrangement of the hole, P, stack, d, boiler, D, and weak braces, M, or their equivalents, adapted to operate together in the manner herein specified.

79,268.—ELECTRIC FUSE.—H. Julius Smith, Boston, Mass.

I claim an electric fuse, in which the end of a single insulating cord, containing two insulated wires, is introduced directly into the cap containing the fulminate to be fired, in the manner described.

79,269.—BOOK BINDING.—William Smith, New York city.

I claim a book, when it has its covers secured to its leaves by tapes, or their equivalents that are passed through the leaves, and then their loose ends fastened to both the outer and inner sides of the covers, substantially as described.

79,270.—AUTOMATIC DENTAL PLUGGING INSTRUMENT.—George B. Snow and Theodore G. Lewis, Buffalo, N. Y.

We claim a plugging instrument, having all its automatic operating parts contained within the case forming the handle of the instrument, substantially as described.

79,271.—TRANSMITTING SIGNALS.—P. A. Sparre, Stockholm, Sweden.

I claim, 1st, The disk, d, in combination with the stop, e, stand, f, and bolt, g, as described.

2d, The rack, i, in combination with the pinion, j, connected with the gear, k, by means of the ratchet wheel, l, in connection with the catch, m, escapement, n, and spring, o, as described.

3d, The plate, p1, affixed to the cylinder, p3, in combination with the lever, q, spring, r, hook, s, and spring, s1, as described.

4th, The plate, t, hinged to its case as shown at, t1, in combination with the rack, i, square, u, pin, u1, and spring, u', as described.

5th, The stop, v, mounted on the disk, d', in combination with the inclined planes, v1, v2, v3, hook, s, and spring, s1, as described, to operate substantially as herein set forth.

79,272.—INSTRUMENT FOR ADDING AND REGISTERING NUMBERS.—Nelson Spofford and Charles Corliss (assignors to Charles Corliss), Haverhill, Mass.

We claim, 1st, The graduated sliding spring bar, b, when applied and operating, substantially in the manner and for the purpose set forth.

2d, The sliding graduated bar, b, in combination with ratchet, f, and toothed-wheel, e, as and for the purpose specified.

3d, The combination with the bar, b, and spring, d, of the system of gearing, and the indicators, as set forth.

4th, The combination of graduated bar, b, casing, a, and head, c, substantially as and for the purpose specified.

5th, The method of adding a series of figures or numbers, by means of a sliding bar, operating a system of gearing or watch-work, substantially as set forth.

79,273.—SLED.—Edward L. Stevens (assignor to Isaac Baker). Houlton, Me.

I claim, 1st, The slotted bar, G, in combination with the spring, D, when constructed and operating substantially as and for the purposes described.

2d, A coasting sled, having rudder, A, bell holder and bell, C, spring, E, slot, H, chains, K, ribbons, O, and stirrups, S, constructed, arranged, and operating substantially as specified.

79,274.—RECIPROCATING STEAM ENGINE.—David Stoddart, San Francisco, Cal.

I claim, 1st, The arrangement of the pistons, B1 B2, small pistons D1 D2, valve, C, and the passages, H1 H2, communicating to the cylinder, substantially as described.

2d, The arrangement of the auxiliary passages, K1 K2, substantially as described.

79,275.—BASE-BURNING FIREPLACE STOVES.—David Stuart and Lewis Bridge (assignors to Stuart, Peterson & Co., Philadelphia, Pa.

We claim, 1st, The base of the stove, enclosing the passages,, E, F and G, arranged and communicating with the pipes, P and P', substantially as described.

2d, Two or more pipes, P and P', arranged within the outer casing of a fireplace stove, for conveying the products of combustion to the chimney, and for heating the air admitted to the space within the said outer casting, all substantially as and for the purpose herein set forth.

3d, The pipes P and P', in combination with the compartments, k, and k', and the valved partition between the same.

4th, The double cover, consisting of plates 2 and 3, one for fitting to the top of the stove and the other to the top of the feeder, and so arranged that the products of combustion can pass between them.

79,276.—REAMER.—Edward Sullivan, Pittsburg, Pa., Antedated June 6, 1868.

I claim the combination and arrangements of the cutters and blank head, C, collar, e, sleeve, D. cone, f, rod, A, and the cutters and blanks, the whole being constructed, arranged, combined, and operated substantially as herein described, and for the purpose set forth.

79,277.—LAMP CHIMNEY.—Michael Sweeney, Wheeling, W. Va.

I claim, as a new article of manufacture a lamp chimney, constructed with an oval bulge, regular in form, and with a uniform curvature, except as to the rounded lens formed projection, B, on the sides, substantially as set forth.

79,278.—HAT.—B. B. Taggart and C. W. Brown, Watertown, N. Y.

We claim, as a new article of manufacture, a hat or bonnet body, molded or pressed from a continuous sheet of formed paper, substantially as and for the purposes herein shown and specified.

79,279.—LUBRICATOR.—Hiram Taylor, Cincinnati, Ohio.

I claim, 1st, A metallic band or collar, I, cast around and within the neck of the reservoir, G, for the purpose of attaching the supporting stem, E, thereto, as specified.

2d, In combination with the band or collar, I, of soft or fusible metal, applied as set forth, the threaded tube or bushing, F, of harder metal, for the reception of a screw on the upper end of the stem, E.

3d, The rod, D, formed with a projection or enlargement, d, on its upper end, to support out of contact with the journal, substantially as described

78,280.—COMBINED LAND ROLLER, FERTILIZER, AND SEED SOWER.—L. D. Taylor, Granville Centre, Pa.

I claim the combination of the front and rear hoppers, I I, and their respective plates, K K, pitmen, P P, levers, L L, rollers, M M, and cylinders, A A, all constructed and operating substantially as specified.

79,281.—BRAKE FOR HORSE POWER MACHINES.—Daniel G. Terrell, Wakefield, Pa.

I claim the arrangement in horse powers, of the mechanism herein described, whereby the break will be self acting when the belt breaks or flies off, and also serves the purpose of a hand brake, to stop the machine when the belt is on in running order, substantially as and for the purposes herein set forth.

79,282.—HORSE POWER.—Daniel J. Tittle, (assignor to Albi M. Tittle, Albany, N. Y.

I claim, 1st, The endless thread composed of the pieces, e e, and furnished with the links f f, outer cogs, g, and middle cogs, h h h, and all in combination with the said tread pieces, e e, substantially as and for the purpose set forth and described.

2d, The gear wheel, K, working on the shaft of the carrying wheels, c, in combination with the lever, i and n, and connecting bar, o, or their equivalents, as and for the purpose set forth and described.

3d, The gear wheel, M, in combination with the drive wheel, D, or its equivalent, and the gear wheel, K, substantially as and for the purpose set forth and described.

4th, The rollers, r r, with their supporting bars, t t, or their equivalents, in combination with the lever, S, and its link, w, and connecting ear, v, or their equivalents, as and for the purpose set forth and described.

5th, The holding clamps, x x', and binding bolt and nut, y, or its equivalents, as and for the purpose set forth and described.

6th, The pan, Z, arranged as and for the purpose set forth and described.

79,283.—CAR COUPLING.—E. R. Whitney, Plattsburg, N. Y.

I claim the arrangement of a four armed cross or wheel, B dog or lever, C, with spring, D, pawl, E, handle, F, and notch, a, all made and arranged in the coupling box, A, and operating substantially as and for the purposes above set forth.

79,284.—HORSE RAKE.—Frank Wicks, Upper Sandusky, O.

I claim, 1st, The runners, E E, constructed substantially as described with the curved part extending from the front extremity to the rear of the line of the points of the teeth, P P, for the purpose set forth.

2d, Locating the post, G, or its equivalent, back of the points of the teeth P P, substantially in the manner and for the purpose specified.

3d, The construction and arrangement of the rods or braces, N O, with the handles and cross bar, l, and nuts, t, t, for the purpose of bracing the handles to the cross bar, l, substantially in the manner described

78,285.—SPRING BED BOTTOM.—Newiel J. Willis, (assignor to the Boston Spring Bed Company), Boston, Mass.

I claim the improved spring bed bottom, as composed of the frame, B, the two round bars, A, the two series of springs, C, (of the kind described), and the series of slats, D, arranged and applied together substantially as described,

Also, the construction and arrangement of the two buttons with the grooved slats and their springs, arranged and applied to such slats and round bars in manner substantially as explained.

79,286.—CHEESE PRESS.—Putnam Wilson, Newport, assignor to R. M. Mansur, Augusta, Me.

I claim the construction and arrangement of the levers, E E, uprights D D, movable bottom, B, upright standard, F, and follower, G, all operated by the rope, I, drum, J, and lever, K, substantially as herein set forth.

79,287.—TAG.—George F. Wright and William Orr, Jr., Clinton, Mass. Antedated June 5, 1868.

I claim the use of a circular or otherwise shaped piece of pastboard, or its equivalent, when inserted between the two thicknesses of the tag or label around which the string, or its equivalent, is looped, in the manner substantially as herein shown and described.

79,288.—LINE HOLDER.—John Hartzell Zinn, Harrisburg, assignor to himself and T. B. Weakley, Dauphin County, Pa.

I claim the arrangement of the lever, D, with central arm, a, pivoted on the frame, A, and arm, C, in connection with the arch shaped flange, B, all made of iron, brass, or other suitable material, for the holding of rope or wire substantially as herein set forth and described.

79,289.—APPARATUS FOR MOTIVE POWER.—S. G. Monce, Marathon, Ohio.

I claim the combinaiton of the verge, g, arm or lever, i, connecting rod, k, and fly wheel, o, all as shown and described.

79,290.—CARBURETER.—Charles Benjamin Willoughby, (assignor to himself and W. A. Bovey, Uhricksville, Ohio.

I claim, 1st, The combination of the oil tank, B, gas chamber, D, pipes and valves, d, all as shown and described, and for the purpose specified.

2d, The combination of the gas chamber, D, gas pipe, E, and valves, f, substantially as shown and described, and for the purpose specified.

3d, The combination of the oil chamber, B, the air supply pipe, C, and valve, c, substantially as shown and described and for the purpose set forth.

79,291.—BREECH LOADING FIRE ARM.—William Morgenstern, Hartford, Conn., assignor to Herman Funke.

I claim, 1st, in combination with a hinged breech block, the firing pin, main spring, and sere, arranged within said block, substantially as described for the purpose set forth.

2d, Making the firing pin and dog, or handle, all in one piece, substantially as described for the purpose set forth.

3d, In combination with a swinging breech and firing pin or hammer the projecting portion, E, the whole arranged to accomplish the locking down of the breech, substantially as described.

4th, The employment, in combination with an extractor, of and ejector, composed of a spring cam or flipper, such as herein described.

79,292.—FRUIT PICKER.—James H. Lament and D. A. Lament, Troy, Pa.

We claim the combination, in a fruit picker, of the vessel, A, and fingers, a a a a, all substantially as shown and described.

REISSUES.

2,996.—HARVESTER RAKE.—C. Aultman, Canton, Ohio, assignee of Daniel E. Swartz and Jonathan Kreamer, Millheim, Pa. Dated May 12, 1868.

We claim, 1st, The combination of a main frame, supported upon two wheels, a laterally projecting platform and cutting apparatus which shall be in advance of the main axle, with the support of a series of combined rake and reel arms, rigidly connected with the finger bar

2d, The combination with a two wheel front cut harvester, of a main frame between the wheels, the hinged supporting bars, L L, the cutting apparatus platform, and series of revolving rake and reel arms pivoted to a central hub, and driven by an extensible shaft from the main axle.

3d, Mounting a combined rake and reel on a front cut harvester, in advance of the main axle.

4th, The combination of a combined rake and reel, having independent hinged arms, a platform hinged to the main frame and the support of the reel and rake rigidly connected with the platform and finger beam, so as to conform thereto.

5th, A series of pivoted arms of a revolving rake and reel, attached near the perciphery of an enlarged head or hub, in lines tangential to a circle, the centre of which is in the shaft around which said arms rotate, so as to cause the revolving beads or rakes to approach the cutter in lines parallel or nearly parallel thereto.

6th, A combined revolving rake and reel, in combination with a hinged bar harvester, a coupling arm, and a movable brace or plate to support the finger bar, platform, and rake and reel.

2,997.—GRASS HARVESTER.—Jonathan Haines, Pekin, Ill., assignee by mesne assignments of himself, Division B. Dated September 4, 1855; reissue 545, dated April 18, 1858.

I claim, 1st, in combination with a laterally projecting finger beam, entirely unsupported at the outer end, and provided with open slotted guard fingers, through which and across said fingers the cutters are reciprocated in straight lines, a connecting rod or brace bar, m, having one end connected with and jointed to the heel of said finger beam, and its other end flexibly connected with the main frame of the machine, for the purpose of controlling the lateral movements of the finger beam, so that the cutters and guard fingers will be kept in unison with each other throughout the up and down movements of said finger beam, independent of the main frame, substantially as set forth.

2d, The drooping bracket, J, extending downward below the main frame, for the purpose of giving support to the crank shaft, and to bring the crank and pitman more nearly in the line with the cutters, substantially as set forth.

3d, The shield brace, Q, connected to the bracket, J, to protect the crank which drives the cutters while passing over cut grass and other obstructions, substantially as set forth.

4th, Connecting the upper end of the brace or bar, m, to the bracket, J, substantially as set forth.

5th, The combination of the guide, y, with the short cutter, h, and open slotted narrow divider, when all are arranged for joint operation, substantially as set forth.

2,998.—GRASS HARVESTER.—Jonathan Haines, Pekin, Ill., assignee by mesne assignments of himself. Dated Sept. 4, 1855. Reissue 545. Dated April 18, 1858. Division C.

I claim flexibly connecting a laterally projecting cutting apparatus, which has its cutters reciprocated in straight lines through open-slotted guard fingers to the main frame of a mowing machine, substantially as set forth.

The main frame and the gearing which drives the cutters of a mowing machine, mounted upon two driving and supporting wheels, a draft pole to draw the machine by, rigidly connected to said frame, and a finger beam and cutting apparatus (the cutters of which reciprocate through open slotted guard fingers in straight lines), flexibly attached to the main frame in such a manner as will permit said finger beam and cutting apparatus to receive all their up-and-down movements from the undulation of the ground over which they are drawn, substantially as set forth.

In a mowing machine having a laterally projecting finger beam flexibly connected with the main frame, a lever so arranged that the driver can, while occupying his seat, by one single movement, raise the finger beam and cutting apparatus bodily from the ground while the machine is in motion, to pass over obstructions, etc., substantially as set forth.

Connecting the lever by which the cutting apparatus is raised to the heel of the finger beam, substantially as set forth.

In combination with the main frame which carries the gearing to drive the cutters, to which is flexibly connected a laterally projecting finger beam provided with open slotted guard fingers and cutters reciprocating across said fingers in a straight line, a lever connected to said finger beam, and having its fulcrum upon the main frame, so that when the finger beam is raised by means of said lever, the weight of the entire cutting apparatus will be borne upon the main frame, substantially as set forth.

The combination and arrangement, in a mowing machine having a laterally projecting cutting apparatus, the cutters of which are reciprocated in straight lines through open slotted guard fingers, and the finger beam flexibly connected with the main frame of a lever conveniently placed within reach of the driver, to raise the cutting apparatus from the ground while the machine is in motion, and a holding device to lock and retain said lever, and hold the cutting apparatus elevated from the ground as desired for transportation, substantially as set forth.

2,999.—HARVESTER RAKE.—Samuel Johnston, Syracuse, N. Y., assignee of Wm. T. Shaw and John Manz, Wilmington, Del. Dated Nov. 22, 1864.

We claim, 1st. The combination of a main frame supported on two wheels, a laterally projecting platform and cutting apparatus, so hinged to the main frame that the cutting apparatus shall be in advance of the main axle, with a series of combined rake and reel arms revolving on a support mounted on the platform.

2d, The combination of a main frame supported on two wheels, a laterally projecting platform and cutting apparatus, so hinged to the main frame that the cutting apparatus shall be in advance of the main axle, with a series of combined rake and reel arms revolving on a support mounted on the platform in front of the main axle, substantially as described.

3d, The combination with a two-wheel front-cut harvester, of a series of combined rake and reel arms on a standard or support, mounted on a hinged platform, the arms being independently hinged, and having a rising and falling movement independent of their axis of rotation.

4th, The combination with a two-wheel front-cut harvester, of a main frame, and a series of rake and reel arms pivoted to a crown wheel or central hub, located on the platform, and driven by an extensible connection with the main axle.

5th, The construction and adaptation of a combined rake and reel, which revolves entirely around a vertical center, so that it may be applied to the platform of a front-cut hinged-bar harvester, in front of the main axle and below the highest point of the drive wheel.

6th, The revolving head, H H', made in two disconnected parts, adapted to be coupled and uncoupled by means of the key, h1, and recess, h2, so as to cause the rakes to operate when the machine is moving forward, and to remain at rest during the backward movement thereof.

7th, The frame or casing, F, formed with the guide, f f', for controlling the movement of the rakes and reels, as described.

8th, In combination with the aforesaid guide, f f', the roller, L, arranged and operating substantially as described, to initiate and assist in the elevation of the rake and reel arms, as and for the object specified.

3,000.—FLUTING MACHINE.—Geo. E. King, New York city. Dated February 26, 1867. Division A.

I claim the guide, E, constructed with one or more curved or arched portions, a', in combination with suitable fluting rollers, substantially as here in set forth for the purpose specified.

3,001.—FLUTED PUFFING.—Geo. E. King, New York city. Dated February 26, 1867. Division B.

I claim the within described puffing, as a new article of manufacture, the same being formed by crinkling, gathering or irregularly waving one portion of the strip of muslin or other material simultaneously with fluting it along the edges of such portion, as at g, and forming flattened borders or portions, h, outside of the flutes, or between two next adjacent rows of them, to receive stitching, substantially as specified.

3,002.—STILL FOR PETROLEUM, ETC.—Charles Lockhart and John Gracie, Pittsburg, Pa Dated November 17, 1863. Division A.

We claim providing a still used for distilling hydrocarbon, with a scraper or scrapers combined with a receiving device, said scraper or scrapers being rotated during the process of distillation, and operating with relation to the bottom of the still and said receiving device, substantially as herein described, and for the purpose set forth.

3,003.—STILL FOR PETROLEUM, ETC.—Charles Lockhart and John Gracie, Pittsburg, Pa Dated November 17 1863. Division B

We claim a still provided with a pipe or pipes which is or are so arranged with relation to a still and its contents, that the vapor evolved from the contents of the still can be conveyed off at different hights, substantially as herein and for the purposes set forth.

3,004.—IMPROVEMENT IN PIANO-FORTES.—G. C. Manner, New York city. Dated November 13, 1866.

I claim 1st, Placing the damp-lifters in a slot of the metal frame behind the point supporting the strings, substantially as and for the purpose described.

2d, The metal frame, A, when embeded in the wood-work of the piano forth, so as to butt against the wrest plank, and when provided with an inverted hollow tilled bridge, a, with a slot, b, and a diagonal brace, d, all made and operating substantially as and for the purpose herein shown and described.

3,005.—BIT BRACE.—Greenleaf Stackpole, New York city, and J. N. Winslow, Portland, Me., assignees of Greenleaf Stackpole. Dated September 23, 1862.

I claim 1st In combination with a divided bit-shank socket, having a contracted neck, the ring, E, for holding the bearings upon the shank of the bit, constructed and operating substantially as set forth.

2d, The bearings, C C', having grooves, a1 and a2, therein, to admit different sized bit shanks without an enlargement of the grooved to the extent of the whole length of the socket or the bit shank substantially as specified.

3,006.—HARVESTER.—Mitchell, Vance & Co., (assignees of Edgar M. Smith) New York city. Dated February 23, 1864.

I claim 1st, In combination with the main driving and supporting wheels, running loosely on their axles or journals, the main gear wheels, D, running loosely on the hubs of said drive wheels, and having a ratchet and pawl connection with each other, substantially in the manner and for the purpose herein described and represented.

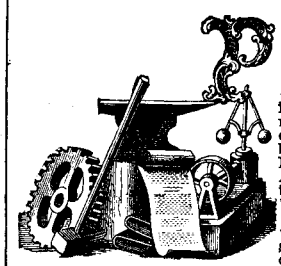
2d, The arrangement of the two sets of plates and boxes on the opposite sides of the main frame, so that the cutting apparatus may be arranged on either side as set forth.

3d The combination with two sets of plates arranged on opposite sides of the main frame, the curved bar or brace, F, extending from one to the other so as to leave unobstructed space at I, for the free action of the rake as described.

4th, In combination with the loose and shifting main wheels and main cogged gears, the pinions, b, permanently arranged on the shaft, d so that loose and shifting wheels will, when on either side of the machine, mesh with said pinions, as set forth, whichever end of the machine goes foremost

5th, Hanging the reel-blades to the reel shaft by means of the crossed arms and adjustable heads, hubs, or sockets, for the purpose of enlarging or diminishing the circumference of the reel, substantially as described.

6th, The adjustable pulley plate and adjustable pulleys thereon, for the purpose of taking up or letting out the reel belt when the reel is lowered or raised on its support, substantially as described.



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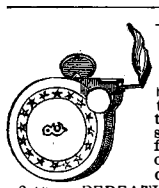

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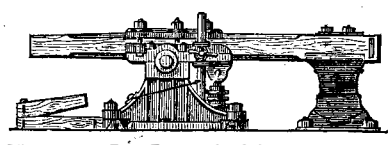

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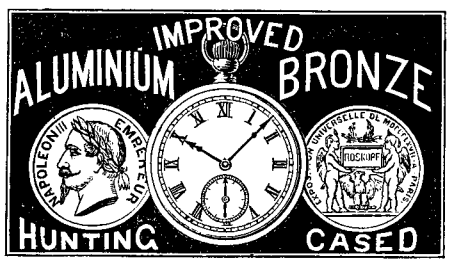

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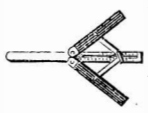

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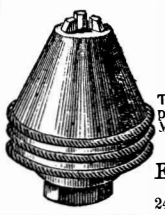

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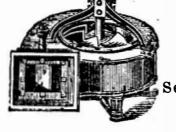

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